

MINING CONGRESS JOURNAL

DECEMBER, 1934




OFFICIAL



PUBLICATION

Merry Christmas - Happy New Year



Tramming
into a room.

Fast Loading

FOR LOW
COAL

with the NEW **360**
GOODMAN

TRACK MOUNTED
LOADING MACHINE



The loading head

GOODMAN

MANUFACTURING COMPANY, HALSTED STREET AT 48TH, CHICAGO

Wilkes-Barre • Pittsburgh • Huntington • Birmingham • St. Louis • Denver • Salt Lake City

LOCOMOTIVES • COAL CUTTERS • LOADERS • CONVEYORS

The SULLIVAN LOAD-O-GRAPH

FOR SCRAPING OR LOADING MATERIALS

FROM
WORKINGS
SHOWN BELOW

to

MINE CARS

ORE POCKETS

CONVEYOR BELTS

RAISES

USE THE SULLIVAN EQUIPMENT SHOWN BELOW

DEVELOPMENT
HEADINGS UP
TO 8 FEET WIDE
Adits, Drifts
or Cross-cuts



MINE CAR LOADER

FREE COPIES OF
THIS CHART
ARE AVAILABLE
ON REQUEST

DEVELOPMENT
HEADINGS UP
TO 10 FT. WIDE



2 DRUM LOADING SLIDE



3 DRUM LOADING SLIDE

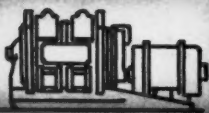
DEVELOPMENT
HEADINGS MORE
THAN 10 FEET
WIDE
HAULAGE WAYS
Adits—Tunnels

ONE THREE DRUM
LOADING SLIDE OR
TWO MINE CAR
LOADERS

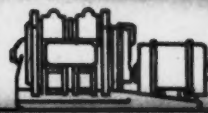


3 DRUM LOADING SLIDE

TRANSFER DRIFTS
LOADING DRIFTS
SLUSHER DRIFTS
SCRAM DRIFTS
TOP SLICING
DRIFTS



2 DRUM SCRAPER HAULER



2 DRUM SCRAPER HAULER



3 DRUM LOADING SLIDE

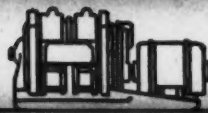


2 DRUM SCRAPER HAULER

NARROW
STOSES



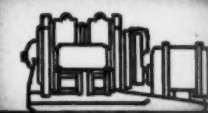
2 DRUM LOADING SLIDE



2 DRUM SCRAPER HAULER



3 DRUM LOADING SLIDE



2 DRUM SCRAPER HAULER

FLAT WIDE
WORKINGS



3 DRUM LOADING SLIDE



3 DRUM SCRAPER HAULER



3 DRUM LOADING SLIDE



3 DRUM SCRAPER HAULER

WIDE STOSES

TWO ADJACENT
HEADINGS
or
STOSES



3 DRUM LOADING SLIDE



3 DRUM SCRAPER HAULER



3 DRUM LOADING SLIDE

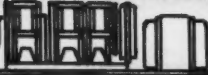


3 DRUM SCRAPER HAULER

RIGHT ANGLED
WORKINGS
or
PILLARED STOSES



3 DRUM LOADING SLIDE



3 DRUM SCRAPER HAULER



3 DRUM LOADING SLIDE

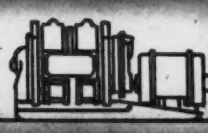


3 DRUM SCRAPER HAULER

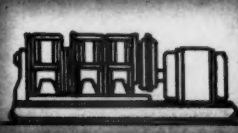
INCLINED SHAFT
WINZE OR
STOPE UP TO
30°



2 OR 3 DRUM SLIDE



2 OR 3 DRUM HAULER



2 OR 3 DRUM HAULER

THE ONLY COMPLETE LINE OF ROCK HANDLING EQUIPMENT FOR THE MINES
SULLIVAN MACHINERY COMPANY



WHAT ABOUT YOUR HOISTING COSTS?

● Although at first glance this might appear to be the remains of some prehistoric mammal, it actually shows the modern, lowest-cost means of transportation from mine bottom to preparation plant—the belt conveyor slope method.

In this slope entry, which serves as a combination conveyorway, manway and material opening, a Link-Belt anti-friction belt conveyor takes coal in a continuous "stream" to the preparation plant. It is 891 ft. long, with a lift of approximately 200 ft.

On the bottom, a Link-Belt electrically-controlled mine car feeder hauls

the mine cars to a Link-Belt electrically-operated rotary dump, which dumps entrain, to a 2-compartment hopper. Reciprocating feeders deliver to the belt conveyor. One compartment of the hopper is for coal and the other for rock. This installation has shown the following advantages:

- Lower initial cost.
- Economy in power.
- Low cost per ton of coal transported.
- Increased capacity.
- Uniform delivery of coal to the plant.
- Low cost of equipment maintenance.

Ability to use larger mine cars.
Longer life of mine cars.

Uninterrupted continuous service.

Link-Belt has made many notable installations of this kind which have cut transportation costs and increased mine output. We would welcome the opportunity of discussing the subject with you. Address: Link-Belt Company, 300 W. Pershing Road, Chicago; Philadelphia, Pittsburgh, Wilkes-Barre, Huntington, W. Va., Denver, Kansas City, Mo., Cleveland, Detroit, St. Louis, Seattle, Toronto, Vancouver.

7151

LINK-BELT

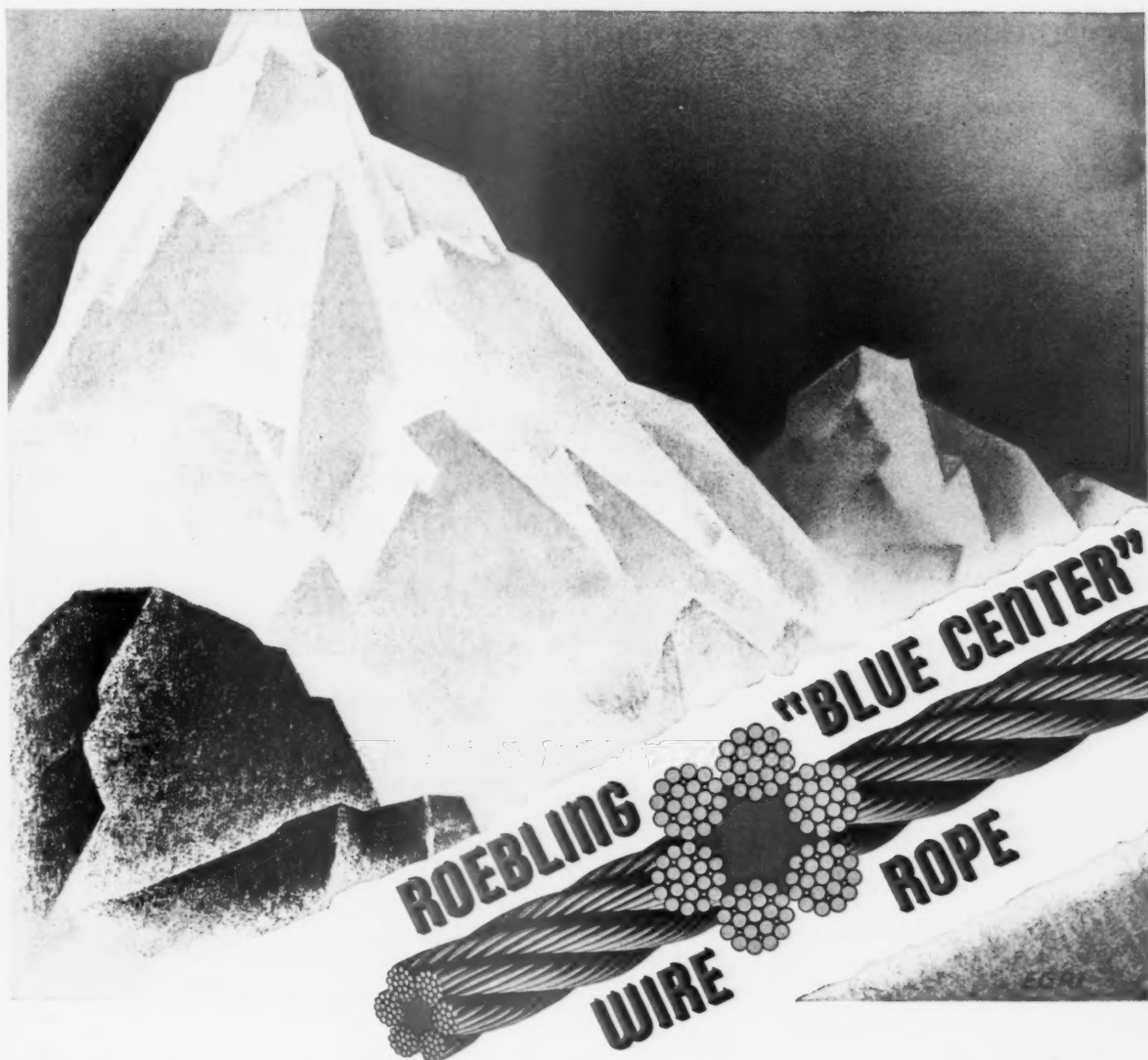
SLOPE BELT CONVEYORS



From UTAH to ALABAMA JOY LOADERS
show real savings in the cost per ton.

JOY MANUFACTURING CO.
FRANKLIN ... PENNSYLVANIA

FOR **PEAK** ROPE PERFORMANCE!



For maximum rope life...for maximum rope safety...use Roebling "Blue Center". The finest wire rope that Roebling produces!

JOHN A. ROEBLING'S SONS CO., TRENTON, N. J.
BRANCHES IN PRINCIPAL CITIES

STRONGER—Wire of highest strength consistent with ductility and toughness

TOUGHER—Provides maximum resistance against wear, sudden shocks, vibration

SAFER—Unequaled for uniformity of quality

SAVING—Insures lowest general average operating cost

THE HIGHEST DEVELOPMENT IN ROEBLING WIRE ROPE

Editorial Director
JULIAN D. CONOVER

Editor
RICHARD J. LUND

Associate Editors
J. F. Callbreath P. D. McMurrer
A. W. Dickinson H. L. Moffett
G. B. Southward B. E. Chambers

Field Representatives
Frank W. Moran
James E. Neary, Jr.

MINING CONGRESS JOURNAL

Vol. 24

DECEMBER, 1938

No. 12

Sentiment favoring amendment of the Wagner Act has been growing by leaps and bounds, and one of the foremost proponents of such action is Senator Edward R. Burke of Nebraska. His forceful address on "Labor Relations" delivered before the AMC Metal Mining Convention at Los Angeles will be a feature of the January issue. Congressman James G. Scrugham's address at the same convention on "The Mining Industry and National Defense" will also be featured, as well as numerous coal and metal operating articles.

CONTENTS

FRONT COVER: Old church in Forest Glen, Md. Photo by Horydczak

	Page
EDITORIALS	
The Trade Compact.....	10
Another Threat to Mining.....	11
Toward Betterment of the Coal Industry.....	11
THE PLACE OF MINING IN THE PROGRESS OF CIVILIZATION.....	12
By Cornelius F. Kelley	
SAFETY IN ALABAMA COAL MINING.....	15
By Frank E. Cash	
A NEW METHOD OF MINING MESABA RANGE OPEN PIT IRON ORE.....	18
By Walter E. Schwedes	
MECHANICAL MINING AT INDIANA AND ILLINOIS COAL CORPORATION..	24
By J. J. Fries	
SLUSHER LOADING IN DRIVING INCLINES AT MASCOT NO. 2 MINE.....	28
By Harley A. Coy	
WITH THE COAL DIVISION OF THE AMERICAN MINING CONGRESS	
The Trend Toward Modern Mining.....	30
By G. B. Southward	
Elevation of Outside Rail on Curved Track.....	31
By Shelly G. Hughes	
Survey of AC Power in Coal Mining.....	32
TO WHAT EXTENT IS MINING INVOLVED IN INTERSTATE COMMERCE?.....	33
By Judge Edgar T. Zook	
THE RIGHT TO MINE—Its Protection Against Encroachment.....	38
By Robert M. Searls	
EFFECT OF THE CANADIAN TREATY ON THE TRI-STATE DISTRICT.....	42
By Evan Just	
PERMISSIBLES.....	43
WHEELS OF GOVERNMENT.....	44
NEWS AND VIEWS.....	46
PERSONALS.....	54
MANUFACTURERS' FORUM.....	55

Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

Published monthly. Yearly subscription, United States and Canada, \$2.00. Foreign, \$4.00. Single copies, \$0.20. Entered as Second Class Mail Matter, January 30, 1915, at the Post Office at Washington, D. C.

Copyright 1938 by

THE AMERICAN MINING CONGRESS

309 Munsey Bldg., Washington, D. C.

Howard I. Young, President
David D. Moffat, Vice President

Edward B. Greene, Vice President
Donald A. Callahan, Vice President

Julian D. Conover, Secretary

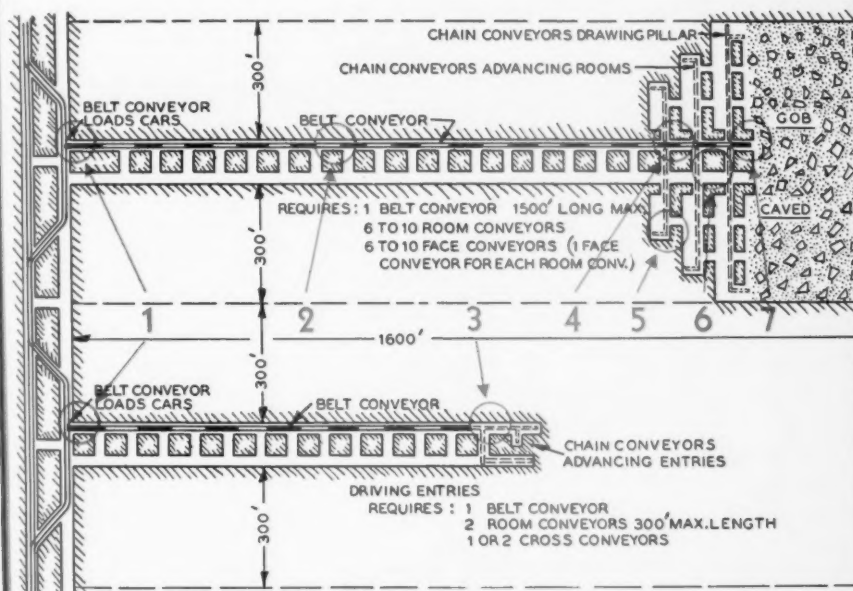
JEFFREY UNDERGROUND CONVEYORS

Engineered to the Job

Lower operating costs, faster development, increased recovery per acre and greater concentration—these make Jeffrey underground conveyor systems the most logical and economical method of extraction in the coal mine today.

Underground conditions may vary widely—but from the broad "61" line of Jeffrey face, room and entry conveyors in a variety of designs, our engineers will select that set-up or system best suited for your own particular condition and tailored to local operating problems.

A typical conveyor-mining set-up is presented below. You can trace progressively the steps gone through in developing face, room and entry methods by the use of various Jeffrey underground conveyors and can readily see that any number of conveyor applications are possible.



The conveyor-mining set-up shown in the above drawing uses a gathering belt conveyor in the butt entry. A series of chain conveyors are shown advancing rooms and entries and drawing pillars. Installation views of these various set-ups are shown at the right.

It will be to your advantage to take counsel with Jeffrey engineers . . . for conveyor mining will prove itself a substantial economy when you do it the Jeffrey way. Ask for one of our engineers to make a study of your mine . . . to show you how sizable cost reductions and improved safety can be worked out for you.

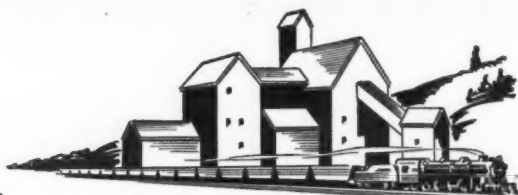
THE JEFFREY MANUFACTURING CO.
958-99 N. Fourth Street Columbus, Ohio

Reg.
U. S.



Pat.
Off.





The Trade Compact

THE signing of the trade agreements with Great Britain and Canada by the representatives of this country is being hailed as a long step toward more friendly relations and increased trade with those countries.

The immediate effect upon the mining industry, however, is anything but satisfactory. That the price of zinc shall have been reduced to the extent of \$6 per ton some six weeks before the compact goes into effect indicates the extent of this blow not only to the districts where zinc is the predominant metal produced, but also to the whole metal mining industry of the West. A blow to any one of the metals which are recovered from the complex ores of the West is a blow to the whole industry. The measure of profit in the production of low grade ores is small at best. The reduction in the price of zinc, resulting from this trade compact, will absorb the entire margin of many zinc producers throughout the country, and force shut-downs of marginal producers.

The blow to that industry will simply mean additional unemployment and additional demand upon the Government for relief appropriations.

It is not merely this blow to the industry, however, that causes the writer deep concern. It is also the fact that these changes have been made without giving that industry the right to be represented in the negotiations, and to exert its proper influence in national affairs in the final determination. It is true that the Committee for Reciprocity Information accorded courteous attention to the interested parties in advance of the negotiations; but the terms of the treaty are conclusive evidence that briefs submitted and statements made before the Committee exerted only a minor influence in charting the final results.

Our Government was founded and has accomplished its greatest advancement upon the theory that every individual, no matter how insignificant, has a right to exert his influence in the determination of national affairs; first, in the caucus of his party in selecting delegates to party conventions who best represented his views; and second, at the polls in voting for those candidates for legislative offices whose views most nearly coincided with his own. So that in the end, the wishes of every individual could find expression through the chosen representatives, if those views were held by enough individuals to constitute a majority.

This meant that the producer of zinc ore, through his representatives in Congress, would have a right to present his case to the various committees and to Congress, and through those representatives to bring about a result which represented the aggregate thought of the citizens of our country.

The result, in a truly representative government, might be a compromise between the users and the producers, but all had been heard in the consideration of the subject matter; and as good Americans they adjusted themselves to the agreed upon conditions as fixed by the Congress, the jury selected by the American people to determine such matters.

The present trade compact has been produced by methods in many ways similar to those employed in totalitarian countries where the government is all powerful, and the individual's rights and aspirations must be satisfied with the conclusion of the central government. Step by step we are surrendering the rights of the people to the power of the central government. Many closely-guarded community rights already are gone, and State rights are on the way out under the influence of Federal aid in the place of State responsibility.

J. H. Cleverly

MINING CONGRESS JOURNAL

Vol. 24

DECEMBER, 1938

No. 12

Richard J. Lund, Editor

ANOTHER THREAT TO MINING

EVERYONE concerned with mining remembers the railway freight congestion of the war times and of the early 1920's. Later the railroads made an excellent recovery in their handling of the nation's freight, and now for 12 years our raw materials and our supplies have been handled with promptness and dispatch.

It was quite natural in the late '20s and early '30s, with memories of disrupted railroad service fresh in the public mind, to consider construction of the St. Lawrence River Waterway from the Great Lakes to the sea; but with the demonstrated ability of the railroads to handle freight traffic and of steam generating plants to furnish electric power, it was also natural for the serious-minded men of this country to turn away from the St. Lawrence Seaway plan. This issue has now been revived following a communication from our State Department to the Canadian Government on May 28, 1938, suggesting the revision and consummation of the St. Lawrence Seaway Treaty. It is anticipated that the Canadian Government will reply in the near future, and that the issue will be up for consideration by the Senate at the next session.

The proposed treaty would greatly increase present tax burdens. The cost of coal to domestic consumers would be increased by reason of higher taxes and freight charges. A St. Lawrence Seaway would also seriously injure the coal industry through loss of the present export trade to Canada, through expanded imports of foreign coal and petroleum, and through the production of enormous quantities of hydroelectric power, which would needlessly duplicate existing facilities for power generation and displace millions of tons of coal. Thousands of miners and railroad workers would thus be thrown out of work.

The Seaway would further injure the mining industry by permitting foreign iron ores to en-

ter the Great Lakes region, and thus disrupt the iron ore industry in Minnesota, Wisconsin and Michigan, which is now the direct support of 74 cities, villages and towns with a population of 190,000 persons.

A resolution adopted by the Coal Division of the American Mining Congress at Pittsburgh December 2, 1938, appears in full on page 47.

TOWARD BETTERMENT OF THE COAL INDUSTRY

FURTHER evidence of the valuable work being accomplished by the Coal Division Committees of the American Mining Congress was conclusively recorded at the Annual Conference held in Pittsburgh December 2 and 3, a complete account of which will appear in the January issue of the JOURNAL. With nearly a hundred prominent operating men and manufacturers' representatives present, the meeting was probably the most successful held in the four years during which these committees of the Congress have been functioning.

The goal toward which the committees are striving is improvement in the efficiency of operating methods, thereby making possible lower production costs. Seven committees at present are working at full speed on the following subjects: Mechanical loading, conveyor mining, roof action, haulage roads, underground power, safety, and surface preparation—and it was formally suggested by unanimous vote of the Board of Governors at the Pittsburgh conference that another committee be organized to undertake the study of all phases of underground illumination.

Personnel on each of the committees is representative of the best brains in the industry—including the manufacturers who naturally play an important role in this work. The results show what can be done through interchange of ideas amongst mining companies and manufacturers of mining equipment.

Men of the coal industry who are contributing untiringly of their time and effort undoubtedly were greatly encouraged by the commendatory remarks made at the conference by such leaders as R. L. Ireland, Jr., J. B. Morrow, P. C. Thomas, Louis Ware, L. E. Young, Harry Moses, and Roy Cox. And from the sincere enthusiasm so much in evidence throughout the two days, the work will go on even more effectively in the future.



—Photo by Frank Ehrenford—Courtesy Copper & Brass Bulletin

The Place of Mining

in the Progress of Civilization*

I APPRECIATE deeply the opportunity that has been given me to address this assemblage tonight. It is an occasion for congratulation to the officers of the organization and to the committees in charge of the arrangements that such a representative gathering of the mining fraternity attended, and that the papers presented and discussed have covered such a wide range of interesting subjects. They have made a distinctive contribution to the literature of the industry in which we are all so interested and so actively engaged.

It seems appropriate to me that this meeting should have been held within the State of California, for to everyone engaged in the non-ferrous metal mining business throughout the globe, and particularly within the United States, there is a realization that the modern mining industry was cradled in the State and began with the momentous day when gold was discovered within its confines.

Origin of Mining Unknown

I said advisedly "the modern mining business," for this is an industry

* Address delivered at Annual Dinner, Metal Mining Convention of the American Mining Congress, Western Division, Los Angeles, Calif., October 27, 1938.

● *Although Its Origin May Never Be Determined, Its Indelible Influence in Shaping World History Will Forever Stand Out in Bold Relief*

By CORNELIUS F. KELLEY

President
Anaconda Copper Mining Company

the beginning of which man knows not. When and how and through what agencies the art of mining first began belongs to the prehistoric past. Its origin is hidden by a veil of such antiquity that it is doubtful if either geological or archeological research will ever reveal its alpha to the inquiring mind. The existence of man and mining may for practical purposes be regarded as contemporaneous.

The advent of mankind, as a chronological event, is unknown, as is also the age when he first undertook to obtain and fashion to his use and adornment the rocks and minerals which his awakening intelligence taught him were adaptable for the purpose which he had in mind.

We do know that there appeared upon this planet a pigmy figure, so

handicapped by physical limitation, so slow of movement and so lacking in the possession of natural weapons of either offense or defense with which to combat, that its extinction seemed foredoomed, and would speedily have occurred, had it not been for the God given attributes of reason and understanding.

These gifts of the Divinity not only enabled him to survive, but made him the conquerer of his environment, and supreme master of the world in which he lives.

Geologists can now construct from the story unfolded by the rocks of ages, and archeologists from the bits of evidence left in barren cave or at the side of some primitive ash dump, a bare outline of the environment in which this creature, uncouth progeni-

tor of modern man, existed. The complete pattern has not been, and probably never will be, known; but scattered fragments, dropped along the dreary way that was traversed down through uncounted centuries, demonstrate that, through the application of the primitive art of mining, existence was maintained, and only as he progressed in it, was he able to step forth boldly to meet the natural enemies that surrounded him, and begin the long and difficult evolution toward civilization.

Before the basic principles of geology had been established and knowledge acquired of the physical phenomena that had transpired in the formation and evolution of the earth's surface through ages of time that preceded recorded narrative, it was difficult to believe that a few chipped flints, crudely fashioned to the shape of arrow heads or cutting implements, told the story of man's great antiquity, and that they were the evidence of his earliest attempt at selective mining.

We do not, and probably never will, know when it was that the first miner, with definite purpose, sought a particular stone in a quarry, chalk cliff, or among the pebbles of a meandering stream, nor when he first began to fashion it to a desired form or shape; but, whenever it was, we do know that these steps marked not only the beginning of mining in an elemental way, but were likewise man's earliest attempt at craftsmanship.

Veiled also by the impenetrable mist of antiquity is the time when man was first able to build a fire. Undoubtedly, from the beginning he had seen its phenomena as the result of the lightning bolt, and his feeble imagination had wondered at the spark flashing from his hammered flint. That he early adapted it to his use is proved by the remains of hearths in the caverns and the ash heaps, where the earliest evidences of human abode are found.

Discovery of Fire for Metal Separation Ushered in Bronze and Iron Ages

It is likewise probable that he had found in his wanderings specimens of native gold and copper in the alluvia of the streams he crossed and that, attracted by their distinctive color and physical properties, he had gathered them and crudely fabricated them into ornaments, weapons and utensils. But, whenever it was, it may be conclusively said that the dawn of civilization began when first he learned that by the application of fire to metals

he could more easily fashion them to a desired shape; and later, and infinitely more important, was the discovery, the most important one in his history, that by the application of fire to a mineral-bearing rock he could separate it from its matrix, and the art of metallurgy was born.

Behind him now was the stone age; ahead the bronze and iron ages, and man was on his way to a destiny, the ultimate outcome of which remains today, and until the end will be, an unsolved problem.

Possessing the materials with which to build, and the necessary tools, the fixed abode was established. Agriculture succeeded the chase as the principal source of subsistence, and the foundation of social organization and development was laid.

Crude as must have been the beginning, limited to bare necessities, the creative instinct was awakened, and, kindled by the spark of imagination, expanded. Artisanry developed and, succeeded by art and science and industry, completed to present tense the chapter of accomplishment.

At every stage, and through each succeeding development the products of the quarry and the mine attended and made possible human effort. Of all physical objects created, these alone remain to bear the testimony of achievement. All else that might speak of material progress was ephemeral.

Glories of Ancient Architecture Attest Mines Influence

The remains of cities buried beneath the sands of time; the tombs of the Pharaohs and the pyramids of Egypt; the glory that was Greece, and the grandeur that was Rome, as exemplified in columns of stone and statues of marble and alabaster; the palaces of Spain, the minarets and pagodas of the Orient, the shrines of the temples and the massive piles that rise throughout the civilized world, surmounted by appropriate emblems reaching toward the skies in tribute to man's Maker—these, all these, attest the influence that mining, and the product of the miner's effort, have had upon the development of civilization.

Let us pause a moment and reflect what would happen in this age of machinery, of industrial effort, if the product of the mines should fail. How rapidly would business stop, commerce disappear, communication cease and civilization fade. Is it not a fact that the evolution of the ages would be followed quickly by a reversal, and would not the curtain of oblivion rapidly descend upon a finished world?

With the creation of material things, beyond the bare requirements of life, there developed the human characteristic of acquisitiveness, the manifestation of which is the desire to obtain and hold those things of necessity, value or convenience, produced, made or held by some, and the possession of which is sought by others.

Therein lies a motivating force that has been one of the greatest factors for good or evil that the human race

has known, for not only has it been a basic cause of war, pillage and rapine, throughout the centuries, but likewise of commerce and industry. This never-satiated trait has been the tragedy and the salvation of mankind.

Metals Supplied Exchange Medium as Trade Developed

As the social organization developed, and desires extended beyond the capabilities of being satisfied from an immediate locality, an exchange of goods and commodities, of which there may have existed a surplus in one vicinity, for those which were produced or manufactured in another, began.

This initial trade was conducted upon a barter basis, and could only be consummated where a mutual need might be satisfied by the exchange of immediately available articles. As these transactions became more numerous, and the variety of articles or commodities were increased, there was created a necessity for a medium of exchange, a common denominator to which could be attached a value as a standard, and thereby measure the relative exchangeable value of any number of transactions.

From time immemorial the metals, because of their peculiar and endur-



CORNELIUS F. KELLEY

ing qualities, have been used as the basis of monetary standards; and again was the miner called upon to furnish the products necessary for the conduct of commerce, and to equalize the complicated processes that govern the movements of exchange the world over, and without which business could not be transacted.

Search for Precious Metals Major Factor in Shaping World History

Buying power requires wealth; the basis of wealth is goods and services. But, when these cannot be directly exchanged, money, as an intermediary, is a necessity. Money meant principally gold, silver and copper. It was the desire to obtain these metals, and particularly the first two, that spurred man to an indomitable effort.

You may view it either as a cause for commendation or condemnation, but this desire has been a great propelling force of human effort. From the mythological voyage of the Argonauts, who followed Jason in search of the golden fleece, and who, for its possession, braved dangers innumerable, and intrepidly and indefatigably sustained misfortune and disaster, down through the centuries, it has fired the imagination and stimulated the courage of the fortune seeker. To discover and possess the source of these metals—symbols of wealth—trackless seas were sailed, continents were discovered and explored, and men and the races of mankind migrated from home lands to distant shores in the quest that has never ended, in the effort which has never been completely fulfilled.

Sails blown by fitful winds carried Carthaginian and Phoenician metal seekers to the outskirts of the then known world, and later, when the magnetic needle pointed the way, adventurous mariners crossed trackless seas in search of the wealth of the Indies.

The rainbow hope of the golden prize that might be found in the fabled land of Cathay inspired Columbus as he sought the aid that made possible his historic voyage, and sustained him in his lonely vigil as he sailed in the wake of the sunset.

The desire to possess the source of gold and silver fired the imagination of conquistadors, and led them through the unparalleled, if unjustifiable, struggle for the treasures of Montezuma and of the Incas.

The shining particles gathering in the race of Sutter's mill, observed by the keen eyes of Marshall, started the

greatest goldrush in the history of the world, and to the new El Dorado came a population from the outposts of the world seeking the gold, the discovery of which proved not only the dominating factor in the subsequent development of America, but also one which largely influenced the economic and political history of the world.

In the development of mining during the half century succeeding the discovery of gold in California was written the most momentous chapter in the history of the American Republic.

Prospector Pioneered in Developing West

It was the pioneer western prospector, unromantic but worthy successor of Argonaut and Conquistador, who, with patience and perseverance, found his way through darkened canyons, followed cascading water courses, scaled the mountain sides—a pick, a pan, a shovel, his equipment; a cayuse or burro his transport; a grubstake his capital; a hope his inspiration—and who unlocked the treasure chest from which there was poured into the economic stream of the nation the gold and silver, the copper, lead and zinc, the wealth which made the salvation of the union possible, built its railways, opened up to settlement its farm land, and established its industries. In short, it was he who gave the impetus that made it possible, in the incredibly short space of time of a generation of men, to write an epic unparalleled in history.

That truly was the golden age of man's existence! American democracy, in its march westward from the Atlantic Seaboard where the banner of constitutional rights and political and religious freedom had been first unfurled, had crossed the Alleghenies, and paused in the valleys that were the eastern tributaries of the Mississippi. Scattered settlements of temporary character had been established on the Pacific slope. The long, tedious and uncertain penetration of a vast domain was in process, but it was the galvanic effect of the opening of the treasure chest of the Sierras and the Rockies by the miner's pick that hastened by generations the settlement of the country, and laid the foundation for the industrial development that put America to the forefront in achievement and national endeavor.

Tonight the American mining industry may well look back upon its past with the earned satisfaction of

successful accomplishment. Today the industry stands equipped and ready to perform its service to the economic welfare of the nation, but that service cannot be rendered unless as a whole the nation prospers and advances along lines of peaceful progress. I would that it were possible to paint our future in terms as glowing as we may refer to our past, but little is there to be gained and much may be lost by failure to recognize and courageously face the difficulties that lie ahead.

Changed Situation Now Faces Us

Certainly it is that we are living in a changed and changing world—a troubled world and one filled with uncertainty. It is difficult to realize that the epitome of man's struggle for culture, art, science and religion has resulted in a structure so unstable. It is difficult to believe that after all the travail through which mankind has passed, reason should hold such a slight sway, and passion should be as potent as the world witnesses today. Nations that have centuries of civilization as a background, within the past weeks have stood in martial array, ready and waiting the narrowly averted command to march to its total annihilation. While at home, doubt, hesitation and distrust have usurped the seats of stability and confidence that so lately dominated the economic life of our country.

The sacrifice that was made to make the world safe for democracy has resulted in unbridled dictatorships and autocracies, and bewildered millions yield subserviently to ambition and caprice vested with the power of assumed leadership. Economic laws have been superseded by political expediences. Constitutional checks have become the subject of open attack. Industry and thrift have been discarded as virtueless, and profligate waste is encouraged and extolled.

Must Make Adjustments to Meet Changing Conditions

After all, humanity, broadly speaking, has not and never will be a static thing. Social, political and economic conditions are continuously in a state of flux, and necessary adjustments must be made. Doubtless at times these adjustments move too hurriedly, at other times too slowly, but the final accomplishment over a period spells the success or failure of the effort. We are in a period of rapid change. Our course has not as yet

(Concluded on page 52)



Safety teams and judges at Sloss-Sheffield Steel & Iron Company first-aid contest in Birmingham

SAFETY In Alabama Coal Mining*

ALTHOUGH reasonably accurate statistics on production and fatalities have been kept since the organization of the State Mining Department of Alabama in 1911, this discussion will be confined to the 13-year period 1925 to 1937, inclusive, and some pertinent information will be given as to coal-mining conditions in Alabama as well as to methods in effect looking to the avoidance of coal-mine accidents and the results that have been obtained.

Coal Beds

The coal measures in the state vary from horizontal to a maximum pitch of 58 degrees. The mines are opened by drift, slope, and shaft developments; the systems of mining are room-and-pillar and modified longwall or wide faces. When developed below the surrounding drainage levels, the workings are almost invariably gassy. There are at least 30 producing coal beds in the district ranging in thickness from 24 in. to 12 ft. and having an average thickness of 4 ft. between roof and floor. In the majority of the beds, from one to eight partings are formed varying in thickness from 1 to 36 in., and usually if a coal bed is free from partings there is likely to be a band of friable rash on the bottom or top of the coal.

* Published by permission of the Director, Bureau of Mines, United States Department of Interior.

● Analysis of Thirteen-Year Record Strengthens Belief That Weekly and Monthly Safety Meetings Most Powerful Aid in Accident Reduction

By FRANK E. CASH

Supervising Engineer
Bureau of Mines Safety Station
Birmingham, Ala.

Accidents

Due partly to the partings in the coal beds, partly to the thinness of the beds, and to some extent to the pitch,

the exposure is probably about 60 percent greater in Alabama than in the average bituminous coal mine of the United States; in 1934 the production per man-hour exposure in Ala-

FATALITIES, BY CAUSES, 1925-37, INCLUSIVE *

Year	Falls	Haulage	Electricity	Machinery	Explosives	Gas and dust	Miscellaneous	Total	Production	Tons per fatality
1925	40	19	11	12	7	65	9	162	20,408,656	125,979
1926	42	31	18	4	0	42	13	139	21,508,812	154,739
1927	61	15	8	2	1	3	33	93	20,190,926	217,106
1928	28	17	13	4	4	0	1	67	18,056,116	269,494
1929	28	19	11	0	0	12	22	72	18,415,914	255,667
1930	34	5	11	2	1	8	0	61	16,007,405	262,416
1931	8	9	2	1	1	3	2	26	12,126,300	466,400
1932	12	2	4	0	0	0	0	18	8,000,000	460,000
1933	10	7	4	0	0	1	0	22	9,000,000	409,091
1934	13	11	3	0	0	2	3	32	9,600,792	312,500
1935	12	2	2	1	0	0	6	23	9,012,743	391,858
1936	20	4	4	1	0	0	3	32	12,698,749	393,711
1937	17	13	0	1	0	34	2	67	14,060,000	208,900
Total	334	154	91	18	14	170	33	814	189,086,413	232,229
Percent	41	19	11	2	2	21	4			

* Figures from Alabama Mining Department.

bama's coal mines was 0.376 ton and the average for the United States was 0.596 ton.

The accompanying table gives fatal accidents by causes and production, and the production per fatality for 1925 to 1937, inclusive.

During the 13-year period there were 814 fatal accidents in the production of 189,026,413 tons of coal. Falls of roof and coal were responsible for 41 percent of these fatalities, gas and dust ignitions and explosions for 21 percent, haulage for 19 percent, electricity for 11 percent, machinery for 2 percent, explosives for 2 percent, and miscellaneous causes, most of which were surface accidents, for 4 percent.

The average cost for compensation and medical attention in connection with accidents in Alabama coal mines is approximately \$3,000 for each fatality and \$100 for each nonfatal lost-time accident. According to information available, there are about 40 non-fatal lost-time injuries from all causes for each fatality. At this rate, the direct cost of accidents for the 13-year period was \$0.0302 per ton, and during the past 5 years it was \$0.0227 per ton—a saving in the past five years of about \$397,000 in mining 54,312,284 tons of coal.

Alabama's accident experience is not one of which the industry can be especially proud, nor does it represent an outstanding reduction in fatal accidents; but when this experience, especially in certain phases, is studied in detail, it provides very definite and concrete examples of the improvement that can result in accident reduction from concerted efforts.

Explosions

During 1925 there were two major explosions and five gas ignitions, which resulted in 65 fatalities. With these disasters in mind, effort was made to prevent explosions in Alabama coal mines.

Mines using rock dust increased its use, made its application more general and more thorough and made periodic samplings and analyses for assurance that the desired or necessary protection was being obtained.

Other mines, in which rock dust had not been used previously, began to rock-dust. The use of water on the cutter bars of mining machines, at the face, and on empty and loaded cars was increased and extended. Electric cap lamps were largely adopted for illumination purposes for the individual workers. Ventilation, most important



Machine runner setting safety post at Sayreton mine of Republic Steel Co. Proper timbering practice is a "must" feature in any effective safety program

in the prevention of gas ignitions and gas and dust explosions, was given closer attention, and along with ventilation came closer inspection and supervision.

The results were not immediate, since in 1926 two major explosions and two local explosions occurred, resulting in 42 fatalities; but in 1927 these measures really began to show beneficial results, and from 1927 to 1936, inclusive, only 2 major explosions and 10 gas ignitions occurred, resulting in the death of 30 men.

However, in 1937 one gas and dust explosion killed 34 men, giving warning that vigilance cannot be relaxed if explosion disasters are to be avoided in Alabama coal mines. A word in regard to this explosion is timely; the report of the explosion by the Alabama State Mining Department shows that among other contributing causes, the following stand out: Inadequate ventilation, insufficient rock-dusting, lax supervision, the use of nonpermissible equipment, and failure of men to be careful. The one consoling feature of this explosion is that not only this mine but other mines and operating companies in the district appear to have taken the lesson to heart, with the result that a stimulus has been given to improving ventilation and to providing more thorough rock-dusting and closer supervision, and, in a number of in-

stances, to the installation and use of permissible equipment.

Falls of Roof and Coal

During 1925 and 1926, while efforts were centered on the prevention of explosions, accidents from falls of roof and coal increased and in 1927 resulted in 61 fatalities. It was recognized then, as it is now, that methods for preventing such accidents are not as well-defined as those that lead to the prevention of explosions; but it was felt that following the right kind of procedure, to a sufficient extent at least a marked reduction could be achieved in accidents from falls of roof and coal. Therefore, the efforts of operating companies, their employees, and interested safety agencies were directed to concerted and continued activities in the prevention of explosions and the reduction of accidents from falls of roof and coal.

In trying to reduce the increasing toll of fatal accidents from falls of roof and coal, supervision was increased; some companies, not already having one, formulated and put into practice a minimum standard system of timbering; and employees were trained and advised as to the proper method of timbering in the working places, and its importance was stressed at periodic safety meetings. As a

Timbering in chain pillar with posts and large cap pieces at Bradford mine of Alabama By-Products Corp. Note rock-dusting



means of obtaining greater protection, practices in the use of headers, cap pieces, and wedges were improved, and in a few instances methods of development and mining were changed to protect the workmen better and reduce roof hazards.

That these efforts obtained results is shown by the fact that accidents resulting from this cause decreased as follows: From 1925 to 1927, inclusive, there were 152 fatalities; from 1928 to 1930, there were 90; from 1931 to 1933, there were 45; and in 1937 there were 17 fatalities from falls of roof and coal. The average per year in the 3-year period 1925-27 was 51, and the average for the past 3 years, 1935-37, was 16, a reduction of nearly 69 percent.

Haulage and Electricity

Progress had been made in reducing the number of accidents from the two major causes, but the accidents from haulage and electricity (most of the latter being from contact with the trolley wire) were increasing in number. None of the causes of accidents had been ignored, but evidently they were not being given sufficient attention.

In 1928 and 1929 greater effort was made to prevent haulage and electrical accidents. With the many types of haulage made necessary by horizontal, undulating, and pitching coal beds with great variations in seam thickness, and by the susceptibility to electrical contact accidents due, at least in part, to the thin coal and to the warm, humid climate, the reduction of accidents from these two causes was not easily accomplished.

However, the reduction in accidents from explosions and falls, due to concerted efforts, stimulated those concerned to reduce the number of accidents from haulage and electricity; haulage was given more attention by supervisors and haulage crews were trained more thoroughly and were cautioned with reference to haulage hazards not only "on the job" but also in accident-prevention courses and in safety meetings. Additional or applicable haulage rules were formulated and enforced—excessive speed was prohibited, the use of rerailers for wrecked cars or trips was made compulsory, and the proper method of blocking standing cars was insisted upon. Some companies straightened and graded haulageways and generally improved the maintenance of haulage equipment.

The methods employed with refer-

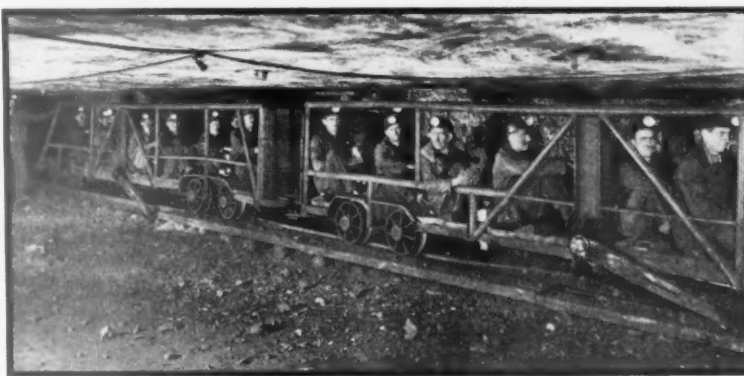
ence to electrical accidents were to encourage the use of protective clothing, shoes, and hats for all employees, and haulage and machine crews also were advised to use gloves and full-length sleeves; to align, raise, or shield trolley wires; to caution the employees regarding the dangers of electricity; and to train employees in first aid, with special emphasis on artificial respiration.

This program had the following results: From 1928 to 1930 there were 41 haulage and 35 electrical fatalities; from 1931 to 1933 there were 18 fatalities from haulage and 10 from electricity; and from 1934 to 1936, there were 17 fatalities from haulage and 9 from electricity. In 1937 there were 13 haulage fatalities and no fatalities from electricity, the haulage record

State inspection department as well as of assisting organizations and employees is also recognized, yet the most important single factor in the reduction of accidents in Alabama coal mines, without reservation, still is "weekly safety meetings for all supervisors and monthly safety meetings for all employees."

Conclusions

The accident experience of Alabama coal mines on a fatality-production basis over the period 1925 to 1937 may be summarized as follows: During the first 6 years, 214,237 tons of coal were produced per fatality, and in the next 6 years 405,593 tons were produced for each fatality. Due largely to a



Loaded man-trip at bottom of slope ready to start outside at Sayreton mine

being by no means as good as it could and should have been.

These combined efforts, stimulated by explosions that occurred in 1925 and 1926 and by fatalities from falls, haulage, and electricity from 1925 to 1928, produced gratifying results on a basis of either production or exposure.

Some Salient Factors in the Accident-Prevention Program

During the first half of the period under discussion, business conditions were good and production was high. Virtually all mines had active safety organizations. Regular safety meetings were held for foremen and for groups of employees or for all employees, where subjects pertaining to accident prevention were taught, explained, and discussed; accidents were thoroughly investigated, and the responsibility for each accident was definitely placed. While it is recognized that it is necessary to have an operating management and to have its support, both moral and financial, and while the need for and advantages of a progressive

coal-mine explosion that resulted in 34 fatalities, the production per fatality in 1937 dropped to 208,900 tons; if this disaster had not occurred, the coal mines of Alabama would have produced almost 426,000 tons per fatality in 1937.

It has been proven that coal mine accidents from individual and combined causes can be reduced materially; during the 13 years there was a period when business conditions made expenditures of money for safety work almost impossible, and during that time accident prevention and safety suffered severely.

With an increase in fatalities from two of the major causes—explosions and haulage—during 1937, the fight against accidents has been given an impetus that should not only check the increase in fatalities and nonfatal lost-time accidents from those two causes, but that should result in improvement all along the line in 1938 and future years in the accident experience, compared with the past 13 years.



Structural steel conveyor gallery viewed from shipping pocket

A New Method of Mining

Mesaba Range Open Pit Iron Ore

A NEW method of mining Mesaba Range open pit iron ore has been provided at the Spruce mine, Eveleth, Minn., by the Oliver Iron Mining Company, mining division in the Lake Superior district of the United States Steel Corporation. This installation represents an entirely new approach to the problems connected with open pit mining. The Spruce mine operated entirely under this new mining method throughout the 1938 shipping season, and the results have been satisfactory.

The physical equipment included in this method can be grouped as follows:

- (a) Two tower excavators, each mounted on a circular track over a vertical raise in the ore body with its self-contained screening and crushing plant.
- (b) A screening and crushing plant, also set over a vertical raise in the ore body, served by an electric shovel and a fleet of 20-ton capacity trucks.
- (c) A belt conveyor system, 750 gross tons per hour rated capacity, 4,480 ft. long, 386 ft. lift, operated in a drift under the ore body along the bottom rock and receiving ore from the above three raises.
- (d) A 500 gross ton capacity receiving and shipping pocket, located in the railroad yards on the surface for shipment to the Lake

● *Oliver Iron Officials Enthusiastic Over Year's Results of Conveyor Operations at Spruce Mine*

By **WALTER F. SCHWEDES**
Electrical Engineer
Oliver Iron Mining Co.

Superior docks at Duluth and Two Harbors, Minn.

The Mesaba Range

Seventy miles north of Lake Superior, trending east and west, runs a low lying range of granite hills that forms the continental divide in this territory, with its north watershed tributary to Hudson Bay and its south watershed to the Mississippi and Lake Superior.

Of greater significance, however, is the iron formation, some 100 miles in length, paralleling its south slope, containing one of those essential raw materials, the presence or lack of which in any nation determines its way of life and the pattern of its international relations. Over a billion gross tons of iron ore have been shipped to date from this range, representing approximately 500,000,000 tons of iron and steel—a major contribution that has been built into the

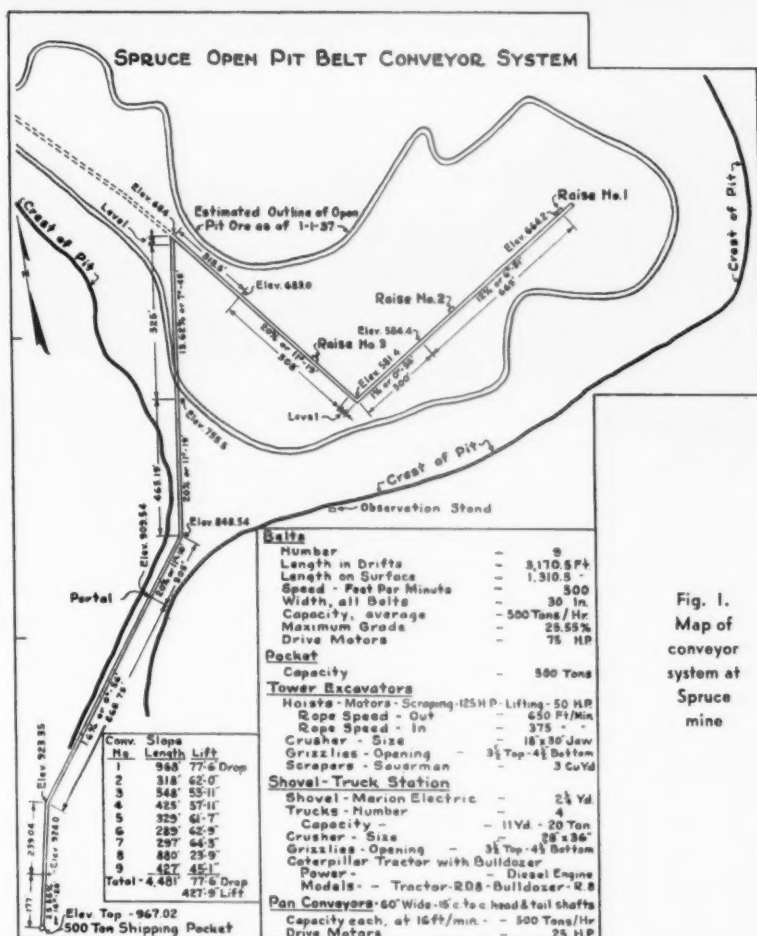


Map showing general location of Mesaba Range

wealth, welfare and habits of this nation.

Present Open Pit Mining Practice

It may be of interest to those who do not keep so closely in touch with the mining industry on this range,



first to review briefly the general open pit mining practice.

These mines have been stripped of their glacial overburden and mined for many years by means of power shovel loading and locomotive haulage. Electric power shovels of 4 and 5-yd. normal dipper capacity for production service have replaced the steam-driven units. These shovels will load, with normal train service, from 100 to 175 standard 50-ton railroad cars in an eight-hour shift. Smaller units are used for general pit clean up. The shovel cuts are from 25 to 30 ft. high, and are generally churned, drilled and blasted.

The haulage rolling stock consists of steam or electric locomotives, 70 to 120 tons on the drivers; hopper bottom cars of 50 to 75 gross tons capacity for the direct shipping ores; and 20 and 30-yd. side dump cars for those ores which must first be delivered to the crude ore hoppers of the screening and crushing plants, to the concentrating mills, and for waste dump materials. The ruling railroad

grades out of the pits vary from 1½ to 3 percent, and 5 to 6 percent grades are not uncommon. Trains of 900 tons pay load in railroad cars are about a maximum on 1½ percent grades.

Problems in Open Pit Mining

These open pit mines are of all shapes and sizes. They range up to 350 ft. in depth today, with ore extending to ultimate depths of 450 ft. The Hull-Rust-Mahoning pit at Hibbing covers an area of 1,100 acres. The ore occurs as a non-homogeneous material that must be mined in grades and quantities and sized to satisfy the Lake Superior cargo demands as fixed by the eastern furnaces. Faulted walls, rock horses, the troughing and folding of the numerous grades of ore, the problem of wall slopes, track benches and drainage, and a shipping season limited by open lake navigation, in which the rate of mining is hampered by the difficulty, of maintaining ship schedules and corresponding train service to the mine ore yards—all

taken together are physical problems that must be met in equipping and operating these open pit mines.

In the development of these open pit properties, the mining engineer first stakes out the top limits of the proposed stripping, possibly along the property lines. As the stripping of the overburden progresses, he must maintain slopes sufficient to hold the increasing height of walls as an insurance against slides. Later, as the mining of the ore proceeds, these slopes are continued with the result that considerable ore tonnage remains tied up, not only in these slopes, but in the necessary track benches. These track benches must be of sufficient length to provide a reasonable operating grade for the locomotive haulage. Double tracks are often provided, or two separate track benches, one on a moderate grade for the outgoing loads, and one of a much steeper grade for the empty trains returning into the pit. As depth increases, it generally becomes necessary to provide switchbacks in order to reach the power shovels, and these switchbacks either tie up an additional ore tonnage or require extensive rock cuts.

It is apparent that eventually the floor of this pit will tend to pinch out, leaving a large tonnage of ore tied up and unmineable by the locomotive haulage method. The cost of extracting this bottom ore becomes excessive because of the slowing down of the locomotive haulage due to the increasing grades and switchbacks and the shortening of trains, which in turn increases the difficulty of maintaining a continuous car supply to the loading shovels.

Cleanup of Older Properties Requires New Methods

We are therefore entering a new phase in the operation of a number of the older Mesaba Range mines due to their increasing depth. New methods must be provided if the industry is to mine out the remaining available ore in such properties.

At a few of these older mines, the available remaining ore has been removed by electric tramping on the floor of the pit through a drift to a hoisting shaft. This method is feasible where the cost of shaft and the hoisting plant can be proven. During the past few years, ore has been successfully produced on a small scale from a number of these older properties by means of shovels, trucks, or tractors and wagons and surface belt conveyors.

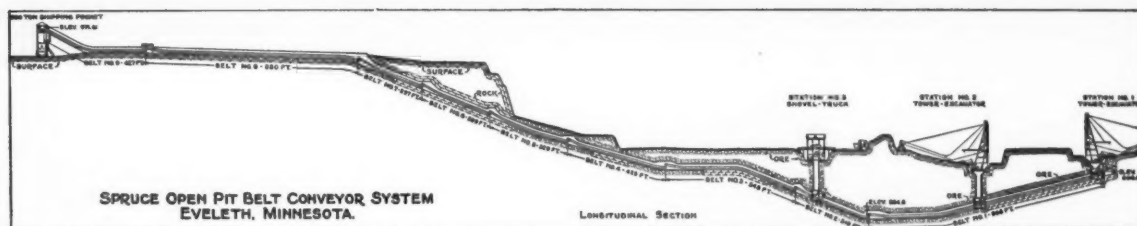


Fig. 2. Longitudinal section of Spruce Mine Conveyor System

The Spruce mine is one of these older properties. It has produced over 25,000,000 tons of ore, and has reached a floor depth where track grades, length of locomotive haul, ore tied up in benches and switchbacks, rock cuts required for future extension of tracks and the increasing proportion of ore requiring screening and crushing presented a problem that called for a new method of mining. Different systems were proposed and studied, and the method here described was adopted as best suited for this specific open pit mine.

The statement that this is a new method of mining does not infer that the component parts are new in principle. The first major conveying belt system, some 4 1/3 miles in length and 350 ft. lift, was installed in 1924 by the Frick Coal & Coke Co., a United States Steel Corporation subsidiary in the Pittsburgh district, which to date has transported over 40,000,000 tons of coal. Likewise, the raises here referred to are simply square, vertical shafts, which, with their equipment, represent a refinement of the old mill or glory hole method of mining. The excavating machinery mounted over raises No. 1 and No. 2 will be referred to hereafter as "tower excavators." Their design is a refinement of machines which have been used for a number of years in the building of Mississippi River levees and to which have been added a screening and crushing plant. However, the joint adaptation and refinement of these principles to the mining of open pit iron ore does provide a new method of approaching this problem.

Three Dressed Up Glory Holes

For the general arrangement of the component parts of this mining method, the reader is referred to the map and profile, Figs. 1 and 2. The three vertical raises, Figs. 3 and 4, each 10 ft. square section, are located in the ore body on 500 ft. centers, and extend from the pit floor to rock bottom. They are timbered, and then close-lined with used rail placed vertical. The bottom of each raise is

hoppered on one side to the skirt-boards of a 60-in. x 15-ft. manganese steel pan conveyor. A 25-hp. induction motor and a variable speed unit permits varying the pan speed from 16 to 4 ft. per minute with a corresponding rate of ore feed to the conveyor belt.

It was originally feared that, when filled to the top, certain grades of ore might, at times, hang up in the raises, but experience has demonstrated that this does not happen unless the raise is permitted to stand full for a considerable period of time with ore of high moisture content. Although the height of ore in these raises is considerable when full, its weight on the bottom pan conveyor is limited by the arching effect which test indicate to be from 12 to 15 ft. above the conveyor, and corresponds to the elevation of the top of the pan hopper.

Two Excavating Methods

The question has often been asked: Why were two entirely different methods of excavating provided? The two tower excavators over raises No.

1 and No. 2 apparently possessed several inherent advantages for this application. They combined digging, haulage, screening and crushing in one unit, in place of the three separate operations when using shovels and trucks. In the problem of ore grade separation, the excavators extract the ore parallel to the grade lenses while the shovel cuts across these lenses. The excavator method of mining provides reserve capacity in its ability to stock ore adjacent to the raise. Stocking is carried on during delays in ships or railroad cars.

The power shovel and trucks serving raise No. 3 are essential as a most efficient combination for cleaning up the ore lying adjacent to the rock walls, and to form the pit slope benches. The operation of these two excavating installations will develop the possibilities of each method and determine their limitations.

Tower Excavators

The two tower excavators (Fig. 3) serving raises No. 1 and No. 2 are unique, not only because they repre-



Head tower serving Raise No. 1. Anchor tower may be seen at extreme right

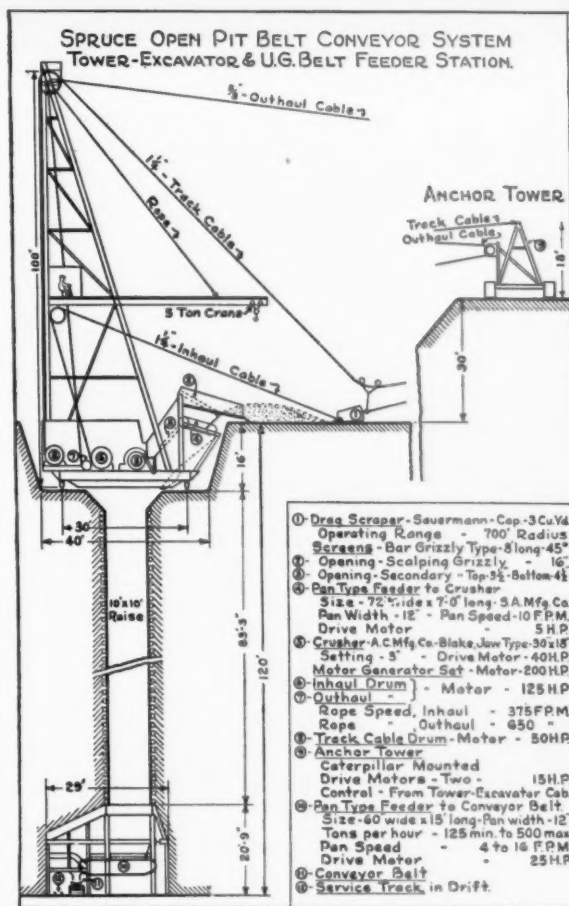


Fig. 3. Tower excavator assembly used at Raises No. 1 and No. 2

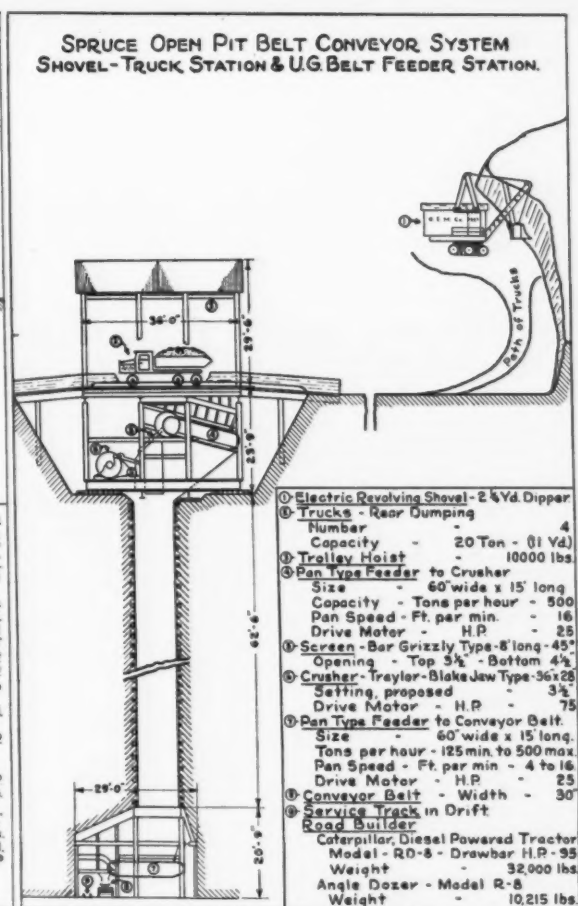


Fig. 4. Screening and crushing plant at Raise No. 3. Shows assembly for shovel and trucks

sent the first large scale application of this principle to mining, but also because, with the belt conveyor system, they combine digging, haulage, screening, crushing, flow storage and transportation in one continuous operation, and thus satisfy the basic requirement of an ideal flow sheet.

The operator's cab is located 40 ft. up in the 100-ft. high head tower from which all operations are controlled, including the motor-driven caterpillar-mounted anchor tower. The 3-cu.-yd. bottomless crescent type scraper is suspended from rear bridle chains by a traveler on the track cable, and loads readily in the ore that has been loosened previously by drilling and blasting. When loaded, the scraper becomes stern heavy, permitting it to ride in on the bottom of its teeth. The average scraper haul is 170 ft., with the raises on 500-ft. centers. The inhaul and outhaul speeds are respectively 350 and 650 ft. per minute. The maximum operating radius between head and anchor tower is 700 ft. With the present

3-cu.-yd. scrappers, these rigs have each produced 60 cars of 50 long tons in an eight-hour shift. They operate continuously throughout the shift; and during delays due to any cause, the outlying ore is stockpiled in front of the head tower from which it can be bailed at a high rate into the conveying system.

The material from the receiving hopper is fed by a pan conveyor to a bar grizzly screen set 3 1/2 in. with the over size passing to a jaw crusher set 3 1/2 in., and the entire product falls by gravity into the top of the raise.

The track and drag cables are powered by the Ward-Leonard type of control, similar to standard power shovel practice. The head and anchor towers are ballasted for the maximum stalled pulls of 40,000 lbs. in the track and the inhaul cables.

The head tower is set over its raise on a 30-ft., 170-lb. rail circle, and is mounted on four equalized trucks arranged to provide a three point mounting. Up in his cab, the operator can rotate the head tower through



Head tower serving Raise No. 2

any desired angle by lifting the approach apron with compressed air, and energizing the motor driven swing machinery; the motor driven anchor

tower follows the rotation by remote control. Excavating through an arc of 15 degrees is carried on by moving the anchor tower only.

Shovel and Trucks

A 2¼-yd. electric shovel and four 20-ton end dump trucks serve the screening and crushing plant over raise No. 3. From the receiving hopper ore is fed to a bar grizzly screen and a jaw crusher arranged in a similar manner to that in the excavator head towers, and also delivers a 3½-in. product directly into the raise.

The electric shovel operates in either the regular ore production or in the wall and bench clean-up work. Rock is trucked to non-ore areas in the pit. This shovel-truck combination provides an efficient and flexible means of meeting the many excavating problems encountered. The principle requirement in truck operation is the maintenance of substantial all-weather roads; the minimum requirement consisting of crowning the hard ore roads with a road grader to get rid of standing water and the building of a cover road over the areas of soft, clayey ore.

Conveyor Transportation

The conveying belt system now in service at the Spruce mine represents the first undertaking which completely divorces a long life mine from railroad haulage. It is the largest so far installed for the transportation of this material.

The total length of the conveyors is 4,480 ft. with a net vertical lift of 386 ft. The rated capacity is 750 long tons per hour at 500 ft. per minute belt speed, equal to the load rating of the 75-hp. motors driving each of the nine conveyor sections.

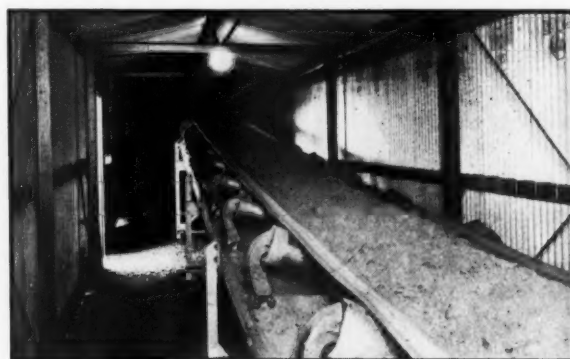
Several major design factors must be given serious consideration when



Mobile anchor tower driven by remote control by operator at head tower

developing conveyors for this iron ore service. A weight of approximately 125 lbs. per cu. ft. when loaded on the belt, together with the elevating duty in transporting the ore from the pit bottom to the surface shipping pocket, requires that the

stations to a minimum. This is essential because the transfer station is by far the outstanding problem of design for this service. These transfer stations must successfully pass, at a high speed, from head pulley to the receiving belt, a high inertia stream



Belt conveyor in gallery approaching shipping pocket. Rated capacity is 750 long tons per hour

grade of belt materials and construction, its unit working tension, and the belt speed be set as high as the present knowledge of the art permits in order to reduce the number of drive

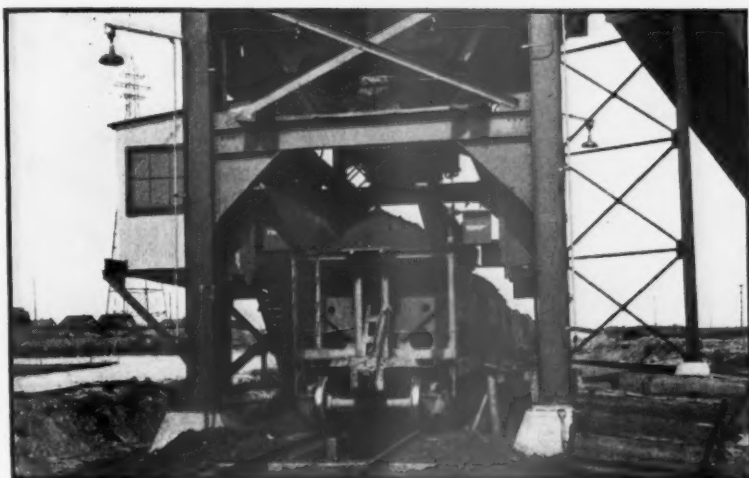
of materials which at times will have the consistency of a fresh batch of stiff concrete. They also represent a high percentage of the first cost of the installation and account for a large



Truck dumping iron ore into screening and crushing plant over Raise No. 3



This 2¼-yd. shovel and four 20-ton end-dump trucks similar to above serve Raise No. 3



500-ton capacity of shipping pocket permits steady conveyor operation during car delays up to 30 minutes

share of the conveyor operating and maintenance expense.

Transfer chutes, designed mostly by the trial method, have been installed between tangent conveyors, and have proven satisfactory to relieve the transfer impact and to trim the load on the receiving belt. Because transfers at an angle present a much more difficult problem, the general recommendation is to locate the conveyor system on a tangent if at all possible.

High Pressure Spray for Cleaning Belt

Cleaning of the return empty belt by means of mechanical devices is not satisfactory, for it is difficult to remove the painty slimes by this method. These slimes laminate themselves onto the snub pulleys and carrier rolls, resulting in noisy operation and increased duty on belt bottom cover and bearings. Hand clean-up from these parts introduces an element of hazard. An equipment of manifold mounted high pressure spray nozzles has therefore been developed for this conveyor system and installed as standard under each of the nine drive pulleys. The slime wash is laundered to a central classifier where the solids are returned to the belt and the liquid pumped to the surface. Experience today indicates that this method offers a satisfactory solution for iron ore conveyors.

Belts of all conveyors are 30 in. wide, of 7 ply, 32 oz. fabric, skim coated, with breaker strip and 3/16-in. and 1/16-in. covers of highest grade rubber. All field joints are vulcanized. The structural steel conveyor frame is decked. The 6-in.

diameter carrier rolls have live shafts carried on ball bearings in a die cast labyrinth seal type housing. Only petrolatum lubrication is used. In some 8,500 such bearings there has been no failure to date. Present experience indicates that lubrication is necessary not oftener than once a year.

On the shipping pocket end of this system, 2,647 ft. of the conveyor is



Full view of shipping pocket

permanently located for the life of the mine. The surface portion, between the portal and the shipping pocket is enclosed in a structural steel gallery. Underground, it travels in an entry driven mostly in ore, following closely the bottom rock of the mine. This entry is timbered with 10-ft. 6-in. caps and 8-ft. posts. Where the drive station openings are located in ore, the main posts and caps are steel. A 24-in. gauge rope haulage service parallels the entire underground portion of the system.

Receiving and Shipping Pocket

The structural steel receiving and shipping pocket, located in the railroad yards, has a storage capacity of 500 long tons, sufficient to permit continuous operation of the conveyor system during delays in car supply of 30 minutes or less. The last of the nine conveyor drive stations is housed at the top of this pocket with its floor 50 ft. above the loading track. The two pocket loading gates and two side spill aprons are air operated. Beneath the rails a concrete trough is provided through the length of the pocket for gathering accumulated spill which is periodically loaded into cars by means of a small motor driven scraper hoist and slide.

Cuts of eight to 10 hopper bottom railroad cars of 50 to 75 tons capacity are drawn from the empty yard, spotted for loading and run into the load yard by gravity and air brake control.

Conclusion

"What do the Spruce mine operators think of this mining method and its equipment," is the fair question frequently asked. They are enthusiastic regarding its present performance.

Naturally, one season's operation of this installation is not sufficient to prove conclusively its maximum possibilities or its limitations, but it has been sufficient to demonstrate that this method of mining will be seriously considered for all future open pit mining operations of a similar nature.

Yellow Aster Increased Output

Addition of a second shift of nine men to the force at the Yellow Aster mine, near Randsburg, Calif., has practically doubled the production of the mine, thus ranking it as one of the biggest gold mining operations in the United States.

According to a statement by Peter L. Johnson, local manager for the Macco Construction Company, under contract to produce the ore for the Anglo-American Corporation, Ltd., the new shift will increase production from 2,100 tons daily to 4,000 tons. A crew of 12 men had operated on the single shift before the addition of the second.

In addition to the men engaged in producing the ore, 60 men are employed in the Anglo-American recovery operations.



Fig. 1. Modern tipple and hoist house serving this mine, with the largest shaft in Illinois

MECHANICAL MINING at Indiana and Illinois Coal Corporation

IN THE highly competitive market existing in the coal business today, underground mechanization has made it possible in numerous instances for coal mining companies to remain in business who could not otherwise compete. This fact is true to a large extent, with the No. 10 mine of the Indiana and Illinois Coal Corporation, located in Nokomis, Montgomery County, Ill.

The Indiana and Illinois Coal Corporation, at the time they purchased this mine, owned and operated several other mines in the states of Indiana and Illinois, which accounts for the name of the corporation.

The mine was sunk in 1904-05, into the No. 6 seam, originally for the purpose of securing railroad fuel. From then until 1919, when it was acquired by its present owners, the mine passed through several hands. At one time in that period, in March, 1916, it held the world's record for tonnage hoisted in an eight-hour shift, 5,803 tons. This tonnage was exceeded later, however, eventually

● *Has Permitted Continuance of Operations at Property That Held World's Record for Tonnage Hoisted in 1916*

reaching 7,012 tons in an eight-hour shift.

Largest Shaft in Illinois

The No. 10 mine has the distinction of having the largest shaft in the state, 12 x 28 ft. in cross section. Because of the size of the shaft, double track cages are in use, and two pit cars are hoisted on each cage, instead of the usual one (Fig. 2). As the cars are of about 5,800 lbs. capacity, nearly six tons of coal are brought out and dumped each time the cage is hoisted during operation. Only one cager and one helper are needed on the bottom for caging, due to the automatic caging equipment.

This company makes its own power, the power plant being located at Witt, Ill., some seven miles southwest of the mine. Power is furnished both to the

By J. J. FRIES
Superintendent
Indiana and Illinois Coal Corp.

town of Witt, and for operation of the mine. The generating equipment consists of one 1,600 KVA Westinghouse steam turbine, and one 1,500 KVA Allis-Chalmers steam turbine (Fig. 3), each generating 2,300 volts. Fuel is supplied to the power plant from the mine over the C. & E. I. and Big Four railroads, the railroad cars being dumped into a hopper and conveyed into the boiler room over a 120-ft. belt conveyor. The power plant operates continuously.

Power for the mine operation is secured from two 1,454 MG sets located in a substation on the mine surface, and one 1,750-ampere MG set

some two and one-half miles from the bottom, in the main east section of the mine. A 1,300-hp. motor drives the conical shaped drum hoist, equipped with a 1¼-in. rope, a 150-hp. auxiliary motor being used for operating the hoist on idle days, and lowering material and equipment into the mine. Power for the hoist is supplied by a 1,820-ampere, 550-volt fly wheel set, the fly wheel being 11 ft. 6 in. in diameter and weighing 15½ tons. Ventilation is taken care of by an intake primary fan, 6 ft. x 15 ft., belt driven by a 100-hp. induction motor.

Seam Conditions

Illinois No. 6 seam at Nokomis lies under some 640 ft. of cover, and varies in height from 7½ to 9 ft., with 8 ft. the general average. The seam is fairly level, local swags seldom exceeding 3 percent and for short distances only. The roof is of slate, and of such a poor nature that all entries are timbered, cross bars on legs being set every 5 ft. Rooms also are closely timbered, the timbers being placed on 5-ft. centers on either side of the room track, and within some 11 ft. of the face. The bottom is a firm fireclay. The No. 6 seam here also contains the ever present blue band, which varies from 15 to 24 in. above the bottom, and up to 2½ in. in thickness. Directly over this blue band is a layer of soft coal which rashes considerably when exposed to the air, and makes a considerable amount of lagging necessary on both main and panel entries.

Room and Pillar Method Used

The standard room and pillar method of mining is employed, rooms being turned on 55-ft. centers, and driven 25 ft. wide. The rooms are turned off the stub entries, and are

necked 15 ft. wide, driven for a distance of 18 ft. and then widened to standard width. Stub entries are driven at a distance of 1,100 ft. A barrier pillar is left between the cross entry and the first room driven off the stub, to protect the cross entries. Cross cuts off the rooms are 15 ft. wide on 60-ft. centers, and cross and main entries are driven 14 ft. wide. The back entry is made 16 ft. wide, since this entry is used later as an air course. By reason of the bad top, all rooms, main entries and cross entries are timbered as described above.

There are three main operating sections of the mine, the first east north section being 11,000 ft. from the shaft bottom. The other two sections, one in the eighth west south, and the other in the eighth east south, are in a distance of some 8,000 ft. The mine output at the present time is a little over 2,800 tons per seven-hour shift, all of the tonnage being loaded mechanically by track mounted loading machines. Thirteen and 15-ton



A. B. STEFFENS
President, Indiana and Illinois
Coal Corp.

Jeffrey locomotives are used for main haulage, and Goodman and Jeffrey locomotives are used for inside gathering. Each of the three operating sections produces about the same amount



Fig. 2. View of shaft bottom, showing double-track cages in use—capacity of each cage about 6 tons per trip



Fig. 3.
One of the
2 large
steam
turbine
generators
supplying
company's
own power

of tonnage, and one 10-ton main line trolley locomotive handles the tonnage from each of the sections to the bottom.

All Cutting Done at Night by Track-Mounted Machines

All of the coal is cut on the night shift by track mounted cutting machines, one Goodman type 324 track mounted cutter averaging about 22 places during the seven hours, and producing nearly 1,000 tons. Machines are equipped with 8-ft. cutter bars, and use the standard cutter chain and cutter bits, wedge type lacing. The



Fig. 4. Three track-mounted machines similar to this cut the mine's entire tonnage

kerf cut is made some 30 in. above the bottom, and over the blue band. The cutting at this height is fairly easy, and cutter chain bits are not tipped, this having been tried and discarded as not having been sufficiently profitable to warrant continuance. Due to the rugged construction of the track mounted type of cutter, the fairly easy cutting, and the large tonnage cut per shift, the maintenance cost of the cutting machines is so small as to be almost negligible. Three track cutting machines cut the entire tonnage of the mine (Fig. 4).

Since the cutting kerf is up in the seam, double shooting is necessary, and four holes are drilled in the top bench and five in the bottom. The top bench is shot first, followed by the bottom. The drillers drill the holes only, the shotfirers making up the cartridges, tamping the holes, and firing the shots. About one and one-half sticks of Equitable pellet powder are used in shooting. Excellent preparation for mechanical loading is obtained (Fig. 5), and this method of drilling and shooting was decided upon only after numerous experiments had been made.

Pit Car Loaders Replaced by Track-Mounted Machines

The company has attempted to keep pace with modern developments in the mechanical loading of coal at the face, making a start in 1928 by replacing hand loading with pit car loaders. At this time these conveyors seemed to be the most desirable type of equipment on the market for use in this mine because of the heavy timbering necessary under the bad top in both entries and rooms. Tonnages as high as 28 tons per man at the face were obtained by this method, and the pit car

loaders were used for a five-year period, by which time the first successful track type loading machine was placed on the market.

Early in 1933 the corporation purchased a Goodman Type 260 track type loader, and after several months' use of the machine, in which period some minor changes were made, the results obtained were so uniformly satisfactory that four more machines of the same type were purchased. The first machine mentioned was also the first of its type put out by the manufacturer, and it continues in daily use at the present time.

These five machines are now loading the entire output of the mine, three of the day shift machines being double shifted and loading on the night shift. Of these three double shift machines, two of them are used in development work only, the third loading out rooms and cross-cuts. The first machine purchased is one of the machines being double shifted, and is carrying its full share of the tonnage loaded with virtually the same maintenance expense as the machines purchased later.

Loading Cycle Described

A 6-ton trolley and reel locomotive serves each loading machine, and panel entries are usually so arranged that a complete loading unit is at work on either side of the panel. In this manner one relay locomotive serves two loading units, delivering loads to the main line parting and bringing empties back to the working panel. At the start of each shift, the service motor handles five empties to the loader, four of these being loaded individually and switched one at a time to the nearest breakthrough. The fifth car is left under the loading machine while the motor goes out after four more empties, and this continues throughout the shift.

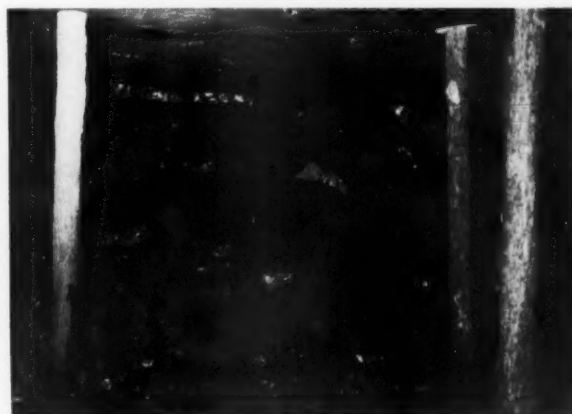
Because of the rashy nature of the coal and the scaling of coal from the ribs, one or two cleanup men follow the loading machine and hand clean the rib coal which has scaled off. It has been found that because of the close timbering, these cleanup men can do this job more economically than can the loading machine. These cleanup men also square up the face for the cutting machine.

The man crew on these panel units is as follows:

- 1 loader operator.
- 1 loader helper.
- 1 cutting machine operator.
- 3 trackmen.
- 2 timbermen.
- 2 service motormen.
- 1 trip rider.
- 1 relay motorman.
- 2 drillers.
- 1 shot firer.
- 2 cleanup men.
- 1 boss.

The three track mounted cutting machines, cutting at night, are averaging nearly 1,000 tons each per shift, and thus the three cutters cut the

Fig. 5.
Fall of
coal ready
for the
loader



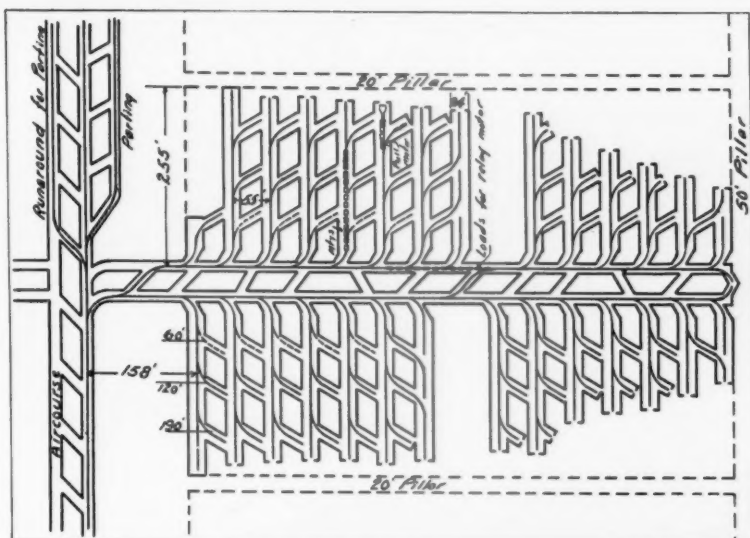


Fig. 6. General plan of room panel

tonnage for the five loading machines, or less than one man charged to each loading unit. Twenty-one drillers and shooters are also drilling and shooting the entire tonnage, a little over two and one-half men to each unit. The two loading machines loading development tonnage at night load considerably less coal than do the day shift machines. (See Figs. 6 and 7.)

Coal Prepared in Modern Plant

The preparation plant on top was remodeled in 1931 by the Morrow Mfg. Co., and was the first of its kind in central Illinois. The structural steel work was done by the St. Louis Structural Steel Co., of East St. Louis. Because of the dual cars on each cage, as the cage is hoisted the coal is dumped into dual hoppers,



Fig. 7. One of the five track-mounted loading machines now handling the entire output of the mine

Fairless Urges Scientific Approach

Observing that the outlook for the near future holds promise of further improvement, B. F. Fairless, president of the United States Steel Corporation, recently urged a scientific approach to the problems which beset modern industry. Mr. Fairless' address was delivered before the annual banquet of the American Society for Metals in Detroit.

"Reports emanating from various sources," Mr. Fairless said, "permit one to harbor a measure of optimism.

For example, there is evidence that certain classes of inventories have been adjusted so that they need not stand in the way of a direct reflection of customer-demand upon producing facilities. Car-loadings have been increasing, recently making a new peak for the year. Automobile output has risen by a substantial percentage as the automotive industry enters its new season. Various, though not all, industries are contributing reports and forecasts which offer words of cheer."

Mr. Fairless stressed the growing importance and significance of chemistry, engineering, and metallurgy in

one for each car and similar equipment for each cage. In other words, there are four hoppers, two on each side. Coal is then released from the two hoppers onto a feeder, whence it goes to the shakers where it is hand picked by 36 pickers and then delivered onto the loading booms. The booms either feed into the cars in prepared sizes, or, if necessary, from the loading booms into a mixer where any two sizes can be mixed and the coal shipped as mine run if such is the market. The mixer is not used unless the two grades are wanted.

The management of the Indiana and Illinois Coal Corporation feel that the expense involved in the purchase of the underground cutting and loading equipment, as well as the preparation plant in the tippie, has been fully justified by the results.

the steel industry since the close of the World War, and singled out competition as one of the reasons which insure a continuing place for technical work in the metals industry. He mentioned competition between and among concerns which make up the steel industry, keen rivalry between ferrous and non-ferrous metals in certain fields of application and competition provided by the sponsors of non-metallic materials. "All of this," he said, "can mean but one thing, that every actor in the arena of business is going to be alert to the last degree, or yield ground to his progressive competitors."

SLUSHER LOADING in Driving Inclines at Mascot No. 2 Mine*

DRAGGING or slushing has been one of the principal methods of loading at this mine since 1926. Prior to dragging, a large part of the production originated in mill holes. When, on account of flattening of bottom, ore would no longer deliver to mill hole raises by gravity, drags were installed. After the ore available to down-hill or level dragging had been removed, it was found in most cases that ore remaining on the down dip side of mill holes could be made to deliver to the raise by up-dip dragging. The bottoms of the ore bodies here dip at angles of 18 to 25 degrees.

About the time up-dip dragging had proven successful in mill holes, plans were being formulated for the sinking of a 1,300 ft. incline on an angle of $20\frac{1}{2}^\circ$. The cross section of the incline is 8 ft. x 9 ft. A drag loader was used in its sinking.

* Presented to Metal Mining Convention, American Mining Congress, Western Division, Los Angeles, Calif., Oct. 25, 1938.

● Use of Slide Ramp Loader Produced Notable Economies Compared With Hand Mucking

By HARLEY A. COY

Mine Superintendent
American Zinc Company of Tennessee
Mascot, Tenn.

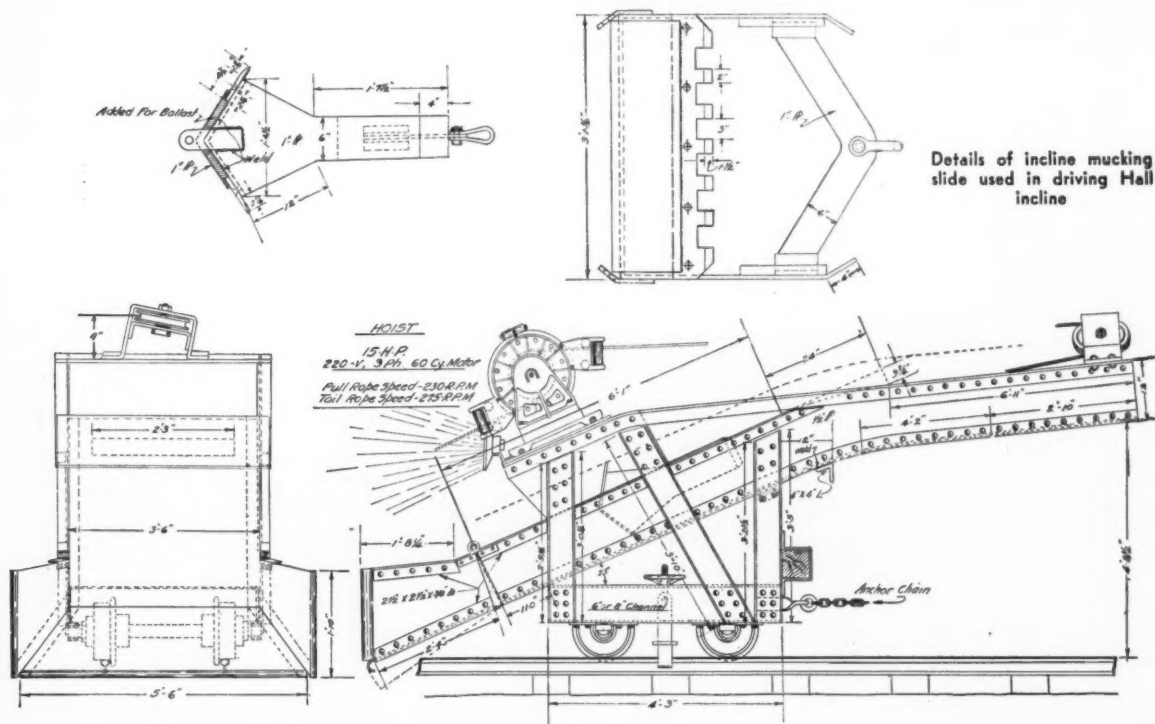
Preparatory to the sinking was the cutting of a station on the main haulage level adjacent to the site of the proposed incline, and the installing therein of a two track layby to serve in both the sinking and the mining from the incline following its completion. Next, the incline was driven upward from the layby on its proposed projection for a distance of 140 feet, where a hoist station was cut and permanent hoist installed.

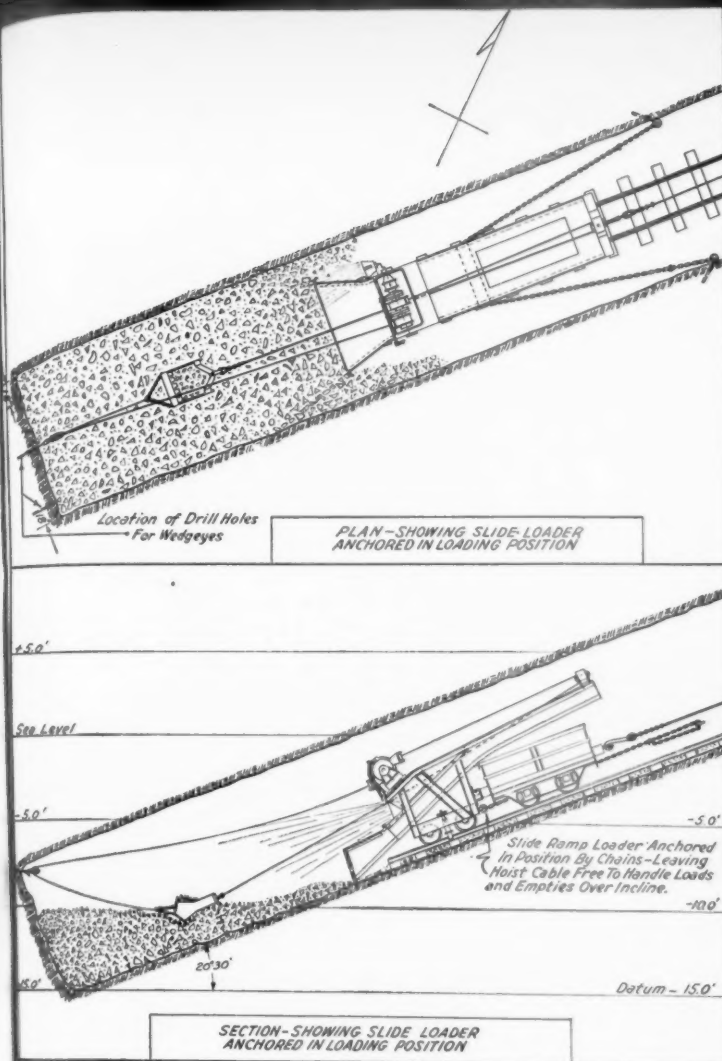
Two-Man Crew for Loading Operation

Sinking was done with Ingersoll-Rand rock drills, and the drilling and shooting cycle was completed during the eight-hour day shift. Loading was

on the following evening shift with an interval of two hours between the shifts. The greater part of the loading was performed by the labor of two men. This in part was made possible by the use of air actuated track switches controlled by the hoistman, and by the use of electric code signals between the hoistman and the man at the working face.

A minimum of water was encountered in the sinking, a small air pump handling all of the water except that which was dragged directly into cars and so brought to the haulage level.





The cars were of all-steel solid body type. It was desirable to leave some water in the heading to reduce the powder gas that accumulated in the broken rock.

Machine Described

The drag slide was of the type commonly used in level drift loading (See accompanying cuts). It was equipped with a 15 hp., electrically driven Sullivan double drum hoist. The slide was lowered into loading position at the face by an Ottumwa Iron Works incline hoist (later used as permanent installation in handling loads and empties on incline), and anchored there by means of chains attached through rings at the back of the slide truck and to a wedge in each rib. The chains were of sufficient length to allow the loading of several headings before relocating the wedge. The lip of the slide was hinged to permit of its being lowered past the end of the rails and to the floor of the

sinking the 1,300 ft. of incline was 5.37 ft. From this footage 32 tons of rock, or 16 2-ton carloads were broken. Eight cars were in service. When seven cars had been loaded and hoisted to the haulage level layby and the eighth empty car had been lowered to loading position, the hoistman hauled the seven loaded cars to the skip pocket tippie with a General Electric trolley locomotive, a distance of $\frac{1}{4}$ of a mile. By the time he had returned to the incline layby with the seven empty cars, the loading operator had loaded the eighth car and had transferred the sheave to the opposite side of the heading.

incline. A split-hook tail sheave was swung from a wedge anchored in the roof of the face. Three such sheave locations were required for the loading of each heading. The hoe was of the "V" shaped box type and was extra heavy. One side was equipped with teeth, the other with a removable straight edge blade. All wearing surfaces were hardened. The tooth edged side of the hoe was only used occasionally for scarifying.

Haulage

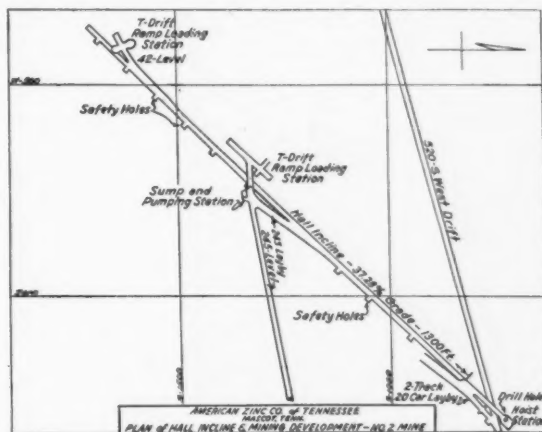
The average daily advance in

Whereupon the above cycle was repeated. The center sheave location was for the purpose of removing a small tonnage remaining against the face and to clean the incline floor to bottom between the face and the slide. A small amount of broken rock remained along each rib, this being used later for track ballast.

TIME DISTRIBUTION OF LOADING CREW

	Time Consumed	
	Hours	Minutes
1st—Loading crew entering mine, gathering up miscellaneous equipment and going to working place..	0	20
2nd—Pumping out heading, lowering and anchoring slide and rigging up....	1	57
3rd—Time consumed in loading cars, handling loads and empty cars on incline, hauling loads with trolley locomotive to tippie and returning empties to incline layby	4	13
4th—Tearing down, moving slide to layby, resetting pump	1	07
5th—Making out loading report and returning to surface	0	23
Total time.....	8	00

The average cost of loading from this incline over a distance of 1,300 ft. by use of drag ramp was \$2.54 per foot. Included in this cost is labor, power used in operating the drag hoist, repairs and renewals, rope expense and miscellaneous tools. In the sinking of another incline in this mine under like physical conditions where the cross section of the incline was 8 ft. x 8 ft. and where the loading was all by hand, the loading cost was \$1.56 more per foot than in this case where the ramp loader was used.



With the COAL DIVISION

of the AMERICAN MINING CONGRESS

THE TREND TOWARD MODERN MINING

A FAITH in the future of coal mining. A belief that through the unity and cooperation of the men who have the background of successful accomplishment, coal can regain its rightful place as a major national industry. A realization that the combined knowledge and experience of these men can solve the many perplexing operating problems that have been caused by the necessity to discard known methods and devise new ones. These are the incentives that are responsible for the time and thought that the committees of our Coal Division are giving toward a constructive effort to help make coal mining a healthy and prosperous industry. A record of what these committees have done and are now undertaking shows the sincerity that is behind their purpose to modernize coal mining.

The Committee on Coal Mine Haulage Roads, under the chairmanship of R. V. Clay, general manager, Hanna Coal Company, at a meeting in Pittsburgh on November 10, selected a series of reports which they recommend for publication in pamphlet form. These reports cover various phases of main line track construction, presenting in clear and concise form the fundamentals as well as the details that enter into the construction of a modern coal mine haulage road.

The Committee on Conveyor Mining, under the chairmanship of T. F. McCarthy, general superintendent, Clearfield Bituminous Coal Corporation, met in Johnstown, Pa., on October 27, to review and approve standard forms designed for keeping daily reports on conveyor operations. The purpose of these reports is to recommend to operators who are using conveyors the important items in labor and material that must be considered in determining cost or performance

● *As Evidenced by the Reports of the Coal Division Committees*

efficiency. The forms, when completed, will furnish a convenient manner of taking and keeping these records both for single and mobile units.

The Committee on Mechanical Loading, under the chairmanship of Newell G. Alford, consulting engineer, met at Pittsburgh on October 28 to review forms for time studies and for keeping daily section reports on the operation of mobile loading machines. The final report as submitted will show recommended forms for keeping such records; however, the committee desires to emphasize that their aim is to show the items that must be considered in figuring cost and performance efficiency of a mobile loading unit, but that the exact manner of compiling these records is a matter for each individual company to determine.

The Committee on Safety, under the chairmanship of J. J. Sellers, vice president, Virginia Iron, Coal and Coke Company, met in Pittsburgh on October 19 to review a suggested set of standard mine safety rules. A number of individual company rules were taken as the basis for this standard. In submitting this report, the committee will point out that no set rules can be devised that can be universally applied, but that there are certain fundamental safety methods that are applicable to all mines. The committee, therefore, will recommend that any company adopting these standard rules must necessarily add certain regulations of their own to cover special conditions.

The Committee on Underground Power, under the chairmanship of Carl Lee, Peabody Coal Company,

with C. C. Ballard, New River Company, as vice chairman, is preparing to conduct a study on the use of AC power underground. A survey covering the methods used by a number of operating companies from all fields of the United States has been made and compiled, and this will be used in formulating the plans for the final report. This committee, a few months ago, in cooperation with a national committee composed of representatives of various manufacturers and users of trolley wire, approved the adoption of a standard size and cross-section for deep-grooved figure 9 trolley wire, as a proposed standard to be submitted to the American Standards Association.

The Committee on Surface Preparation, under the chairmanship of T. W. Guy, consulting engineer, is preparing a report on coal screening and is also supplementing their report prepared in 1937 on "Dewatering Washed Coal." These reports are based on methods and results of successful operating plants, and data are now being prepared and gathered.

The Committee on Roof Action, under the chairmanship of F. G. Smith, general superintendent, Sunday Creek Coal Company, was organized on November 1. The purpose of this committee is to conduct an investigation into the roof experiences observed in various methods of mining, and to gather data that may lead to the determination of the factors that govern the action that takes place both in the immediate roof and the overlying strata.

G. B. SOUTHWARD,
American Mining Congress.

MINING CONGRESS JOURNAL

ELEVATION of OUTSIDE RAIL on CURVED TRACK

With the COAL DIVISION

● A Report Prepared by the Committee on Coal Mine Haulage Roads

THE centrifugal force of a train passing around a curve should be neutralized by an equal and opposite force. To accomplish this result the outer rail is elevated above the inner, and the amount of this elevation is dependent on the gauge of the track, the speed of the train and the radius of the curve.

It has not been generally customary in constructing coal mine haulage roads, to regard the rail elevation on curves as of sufficient importance to warrant much attention, and this matter is often left to the discretion and judgment of the track layer. However, as coal mining becomes more modernized and the efficiency of the haulage system becomes an increasingly greater factor in the operating cost, certain refinements in track construction, heretofore overlooked, are being found to yield a return.

The correct amount of elevation which should be used for any given set of conditions can be calculated by the formula as submitted below, and the adoption of this procedure in haulage road construction will tend to decrease the cost of track maintenance, and furthermore will tend to lessen interruptions caused by serious wrecks or minor derailments.

Formula for Rail Elevation

$$E = \frac{gv^2}{32.2R}$$

E = Elevation of outer rail in feet

g = Gauge of track in feet

v = Speed of train in feet per second

R = Radius of curve in feet.

To reduce the formula to units more commonly used

$$E = \frac{.067 GV^2}{R}$$

E = Elevation of outer rail in inches

G = Gauge of track in inches

V = Speed of train in miles per hour

R = Radius of curve in feet.

At the point where tangent track passes to a circular curve there are two conflicting requirements. The track cannot be level across as required for tangent track and have the outer rail elevated at the same time. Though not entirely satisfactory, the transition may be accomplished by elevating the outer rail on the tangent for 50 to 100 feet back from the point of curvature.

The accompanying tables show the amount of rail elevation in inches calculated

OUTER RAIL ELEVATION FOR 36" GAUGE TRACK

Radius of curve in feet	Speed—Miles per hour									
	4	6	8	10	12	14	16	18	20	25
20....	1 1/8"	4 3/8"	5"							
30....	1 1/4"	2 7/8"	5"							
40....	1"	2 1/8"	3 7/8"	5"						
50....	3/4"	1 3/4"	3"	4 3/4"	5"					
60....	5/8"	1 1/2"	2 1/2"	4"	5"					
75....	1/2"	1 1/8"	2"	3 1/4"	4 5/8"	5"				
100....	3/8"	7/8"	1 1/2"	2 3/4"	3 1/2"	4 3/4"	5"			
125....	1/4"	3/4"	1 1/4"	1 7/8"	2 3/4"	3 3/4"	4 7/8"	5"		
150....	1/4"	5/8"	1"	1 5/8"	2 1/4"	3 1/8"	4 1/8"	5"		
200....	1/4"	3/8"	3/4"	1 1/4"	1 3/4"	2 3/8"	3 3/8"	3 7/8"	4 3/4"	5"
300....		1/4"	1/2"	3/4"	1 1/4"	1 1/8"	2"	2 5/8"	3 1/4"	5"
400....		1/4"	1/2"	3/4"	1 1/4"	1 1/8"	1 1/2"	2 1/8"	2 3/4"	3 3/8"
500....			1/4"	1/2"	3/4"	1"	1 1/4"	1 1/2"	1 7/8"	3"
1,000....				1/4"	3/8"	1/2"	3/4"	1"	1 1/8"	1 1/2"

(Note: 5" Maximum.)

OUTER RAIL ELEVATION FOR 42" GAUGE TRACK

Radius of curve in feet	Speed—Miles per hour									
	4	6	8	10	12	14	16	18	20	25
20....	2 1/4"	5"								
30....	1 1/2"	3 3/8"	5"							
40....	1 1/8"	2 7/8"	4 1/4"	5"						
50....	3/4"	2 1/2"	3 5/8"	5"						
60....	5/8"	1 5/8"	3"	4 5/8"	5"					
75....	1/2"	1 1/8"	2 3/4"	3 3/4"	5"					
100....	3/8"	1"	1 3/4"	2 3/4"	4"	5"				
125....	1/4"	3/4"	1 3/8"	2 1/4"	3 3/4"	4 3/8"	5"			
150....	1/4"	5/8"	1 1/4"	1 7/8"	2 3/4"	3 3/8"	4 3/4"	5"		
200....	1/4"	3/8"	7/8"	1 3/8"	2"	2 3/8"	3 3/8"	4 1/2"	5"	
300....		3/8"	6/8"	7/8"	1 3/8"	1 7/8"	2 3/8"	3 1/8"	3 3/4"	5"
400....		1/4"	1/2"	3/4"	1"	1 1/8"	1 3/4"	2 1/8"	2 3/4"	4 3/8"
500....		1/4"	1/2"	3/4"	1"	1 1/8"	1 3/4"	2 1/8"	2 3/4"	3 1/2"
1,000....				1/4"	3/8"	1/2"	3/4"	1"	1 1/8"	1 3/4"

(Note: 5" Maximum.)

OUTER RAIL ELEVATION FOR 48" GAUGE TRACK

Radius of curve in feet	Speed—Miles per hour									
	4	6	8	10	12	14	16	18	20	25
20....	2 1/2"	5"								
30....	1 3/4"	4 3/8"	5"							
40....	1 1/4"	2 7/8"	5"							
50....	1"	2 1/4"	4 1/4"	5"						
60....	7/8"	1 7/8"	3 3/8"	5"						
75....	5/8"	1 1/2"	2 3/4"	4 1/4"	5"					
100....	1/2"	1 1/8"	2"	3 1/8"	4 5/8"	5"				
125....	3/8"	7/8"	1 5/8"	2 1/2"	3 3/8"	4 3/8"	5"			
150....	3/8"	3/4"	1 3/8"	2 1/8"	3 1/4"	4 1/8"	5"			
200....	1/4"	3/8"	1"	1 5/8"	2 1/4"	3 1/8"	4 1/8"	5"		
300....		1/2"	5/8"	1 1/2"	1 7/8"	2 1/8"	3 3/4"	4 1/2"	4 1/4"	5"
400....		1/2"	5/8"	1 1/2"	1 7/8"	2 1/8"	2 5/8"	3 1/2"	3 1/4"	5"
500....		1/4"	3/4"	1 1/2"	1 7/8"	1 1/2"	1 5/8"	2 1/8"	2 1/4"	4"
1,000....			1/4"	3/8"	1/2"	3/4"	1"	1 1/8"	1 1/4"	2"

(Note: 5" Maximum.)

culated according to the above formula, and applied to the various gauges, curve radii and traveling speeds that are encountered in usual mine service. In actual practice it would probably be an unnecessary refinement to use elevations of less than 1/2 inch, but these minimum elevations

are shown in the table to illustrate the application of the formula. The table eliminates elevations of greater than 5 inches, as this figure probably represents the maximum for practical use in coal mine haulage operation.

Submitted 1938 by
SHELLY G. HUGHES.

THE increasing use of machines in coal mining is forcing new methods in the use and transmission of electric power underground. Lost time from power interruptions and lower efficiency due to inadequate voltage have been found to be cost items that few mines can afford, as has been proven by hundreds of time study analyses of machine operations.

Among the things that are being adopted to lower the cost of mining is the use of alternating current. As in every new method, there are advantages and disadvantages over the old ways, and in order to determine just what benefits will accrue through the extended use of AC power underground, the Coal Division of the American Mining Congress has proposed to undertake a study of this subject.

Survey of Power Systems

A first step in this study was to request from a number of typical larger capacity mines in the United States such general data as would give a comprehensive cross-section of the present modern underground power systems. The table below gives a summarized compilation of the replies received from 62 coal companies covering all fields, from the Appalachian through the Central States to the Rocky Mountain District. This survey may not be truly representative of the entire coal mining industry of the United States but it is representative of the modernized operations, and therefore indicates the trend we may expect in the future. An examination of the figures in this table brings out some interesting points, and the following discussion is presented merely for the purpose of calling attention to these points and not with the thought of trying to prove or disprove anything.

The most noticeable feature of this survey is that the location of the machines seems to be a factor in the type of current used. Practically all of these companies—over 90 percent to be exact—use AC power exclusively for their tipples, mine fans and other surface facilities. This expresses an almost unanimous preference for AC power in outside service. At the working faces underground, however, this proportion is reversed and, as shown in the last line of Table 1, there are only seven mines—slightly over 10 percent—that use AC power for all underground machines (with the exception of the haulage locomotives).

SURVEY OF AC POWER IN COAL MINING

Submitted to the Committee on Underground Power

But between these two extreme locations—surface and mine workings—are the main pumps which are usually within a fairly close distance from the outside, and the table shows that nearly 60 percent of these pumps are operated by AC power.

Looking at this picture as a whole, showing that 90 percent of the surface machines, 60 percent of those that are a short distance underground and 10 percent of the ones at the face, are using AC power, we get the distinct impression that AC is forcing its way into all the underground workings—through some difficulties perhaps, but nevertheless advancing. The seven mines that are operating entirely on AC power are evidence that its use for the face machines has been found practicable, and the fact that these mines are scattered throughout all fields seems to indicate that the idea is spreading and gaining ground.

Although it was not the intent, in getting these data, to confine the survey to mines using mechanized loading, Table 2 shows that only 13 oper-

ations of this group (about 20 percent) use hand loading entirely. The other 80 percent have either mobile mechanical loaders or face conveyors, but the data sheets do not disclose whether these mines are entirely or only partially mechanized. However, it is of interest to note that five operations are using AC power with mechanical loaders and four operations are using AC on face conveyors.

There would appear to be no serious problems in using AC for face and room conveyors, but the matter would seem to be a little more difficult with mobile mechanical loaders and cutting machines; and just how these machines get their current in tramming from one working place to another is a detail that will have to be revealed by further study. However, there are many other details to be learned, and this survey is presented with the thought that a study and report of this subject made by the Power Committee of our Coal Division would be of benefit to the mining industry.

TABLE 1—COMPILATION OF SURVEY SHOWING USE OF AC AND DC POWER IN COAL MINES

	Pennsylvania and Ohio		West Virginia		Virginia Kentucky Tennessee		Illinois and Indiana		Rocky Mountain States		Total	
NO. MINES REPORTING...	19	18	18	18	11	7	7	7	7	62	62	62
Surface Power:	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC
Tipple	17	2	17	1	9	2	6	1	7	0	56	6
Mine Fans	18	1	16	2	10	1	6	1	7	0	57	5
Other Outside	15	1	17	1	8	0	6	1	7	0	53	3
Underground Power:												
Main Pumps	13	6	8	8	4	8	5	3	5	0	35	25
Gathering Pumps	0	17	3	14	1	10	3	3	4	3	11	47
Cutting Machines	0	19	2	16	1	10	3	4	4	3	10	52
Mechanical Loading	0	13	0	10	1	7	3	4	1	4	5	38
Conveyors	0	8	1	8	0	5			3	2	4	23
Drills	0	17	1	13	1	10	3	4	2	3	7	37
Mines using AC power for all underground machines except locomotives	0		1		1		3		2		7	

TABLE 2—

METHODS OF LOADING

	3	6	2	0	2	13
Mines with all hand loading...	3	6	2	0	2	13
Mines with mechanized loading	16	12	9	7	5	49
(a) Mobile Loaders	13	10	8	7	5	43
(b) Face Conveyors	8	9	5	0	5	27

To What Extent is Mining Involved in Interstate Commerce?*

THE question for discussion this afternoon is a very broad one, but it may be assumed that the Mining Congress is interested primarily in the effect on the mining industry of the National Labor Relations Act and the Wage-Hour Act, the two acts passed by Congress under its power to regulate interstate commerce which most vitally concern all industry today. This paper, therefore, will be confined to a discussion of the relation of these two acts to the mining industry.

As the constitutionality of the Labor Relations Act was upheld by the Supreme Court in April, 1937, and the Act has since been interpreted in a variety of cases, both by the Supreme Court and by the various Circuit Courts of Appeal (although only a few of the cases deal directly with mining), there is sufficient precedent from which a lawyer must conclude that the greater portion of the broad field of mining activity is subject to the Act and to the jurisdiction of the National Labor Relations Board. To date there has been no decision of the Supreme Court, and there is but one Circuit Court of Appeals decision, that of the Idaho Maryland Mines Corporation, holding that any mining activity is beyond the jurisdiction of the Board. The decision in that case has become final by the failure of the Board to file a petition for a review of the case by the Supreme Court, although it is within the bounds of possibility that the ruling of the lower court may be upset by the Supreme Court in some later case involving similar facts. The case will be more fully discussed later in this paper.

Until the Supreme Court in some similar case shall pronounce the final word, one can only say that there is presumptively a definite part of the field of mining which lies without the jurisdiction of the Board, and that there is a substantial area of debatable ground, as yet undefined, which would also appear to be without the Board's jurisdiction.

* Presented to Metal Mining Convention of the American Mining Congress, Western Division, Los Angeles, Calif., October 25, 1938.

● Wagner Act Decisions Reviewed, Situations Requiring Decision Outlined, and Operations Seemingly Outside Act's Provisions Summarized

By JUDGE EDGAR T. ZOOK
Counsel,
Idaho Maryland Mines Corp.

+ + +

EDITOR'S NOTE: In delivering his paper at the convention, Mr. Zook stated that interpretive bulletins received on the morning of his talk would require that his opinions expressed regarding the Wage-Hour Act be modified. His revised thoughts on the Wage-Hour Act will therefore appear in a later issue.

+ + +

It may be of interest to make a brief survey of the state of the law with respect to the powers of Congress over matters affecting interstate commerce, as it stood when the Labor Act was passed. It has been said that the many local restrictions on commerce, in the way of taxation, harbor tolls and other levies, which the several states had adopted from purely local and selfish motives under the Articles of Confederation, furnished one of the chief reasons for calling the Constitutional Convention; and the Constitutional grant to Congress of the power "to regulate commerce with foreign nations and among the several States, and with the Indian tribes," was absolutely essential to any effective scheme of Federal union.

Expansion of Powers Under Commerce Clause

The power, at first exercised on subjects more obviously and directly connected with the actual movement and sale of goods in interstate commerce,

was gradually extended by legislative enactments and supporting judicial approval to cover many subjects which the framers of the Constitution, living in a predominantly agricultural country, with few industries, and those highly localized, could never have visualized. In the field of transportation, when the railroads spread over the land, it was found necessary for the Federal power to override local authority and law conflicting with the Federal regulatory control over the transportation systems.

Long prior to the adoption of the National Labor Relations Act, the Supreme Court had held, in a great variety of cases, that Congress had the power not only to regulate matters occurring directly in interstate commerce, but also to regulate and forbid any practices, the intent or necessary effect of which might be to obstruct, burden or restrain interstate commerce; and the fact the activities might be local to one state in their immediacy would constitute no defense to the jurisdiction of Federal legislation, if in fact the effect of such activities was to interfere with interstate commerce. The power of Congress, however, was not all-embracing, for any act sought to be regulated by it must have a "direct," "close," and "intimate" relation to interstate commerce, and if it does not occur directly in such commerce, its interference must be "material" and "substantial."

Employers had from time to time successfully invoked the aid of the Federal courts under the Sherman Anti-Trust Act to restrain the activi-

ties of strikers, often purely local in a physical sense, by showing that such activities had the intent or necessary effect of obstructing or restraining the interstate commerce of the plants or mines involved. The local activities of commodity exchanges and of stockyards had been held subject to Federal regulation and control, because of their effect on the interstate movement of the commodities traded in or the livestock passing through. The Railway Labor Act of 1926, guaranteeing to railroad employes the rights of independent organization and collective bargaining, and incidentally providing for the reinstatement with back pay of employes wrongfully discharged, had been upheld by the Supreme Court; and railway employes engaged in the repair of equipment standing idle at a local repair shop were held to be entitled to the benefits of the act, because of the fact that such repair work was a necessary incident to the maintenance of the equipment as instrumentalities of interstate commerce.

Basis for National Labor Relations Act

The theory of the National Labor Relations Act, as expressed in Section 1, which might be called the preamble, is that the denial by employers of the right of employes freely to organize and the refusal of employers to accept the principle of collective bargaining cause strikes and other forms of industrial strife which have the intent or necessary effect of burdening or obstructing commerce in certain specified ways, the most important of which, so far as we are here concerned, is described as "materially affecting, restraining or controlling

the flow of raw materials or manufactured or processed goods in commerce"; and commerce is later defined in the act according to the generally accepted definition of interstate commerce, with the inclusion of any commerce within the District of Columbia or any Territory. (Any persons here who own mines in Alaska or the District of Columbia, except those extracting gold from the Treasury, may now leave the room; and it would be well for them to approach their new teacher with sweet smelling bouquets, for the Board is a stern taskmaster, and the pupils almost invariably give the wrong answer.)

The Act proceeds to declare it to be the policy of the United States "to eliminate the causes of certain substantial obstructions to the free flow of commerce" by encouraging the practice of collective bargaining and protecting the workers in their full freedom of association, self-organization and designation of representatives of their own choosing for negotiation with their employers and other mutual aid and protection.

After providing for the creation of the National Labor Relations Board, its salaries and personnel, the act defines certain unfair labor practices on the part of employers, and vests in the Board two great powers—first, that of determining and certifying the representatives of the employes of any industrial plant; and, second, the power to prevent any person from engaging in any of the unfair labor practices specified in the Act. The Labor Board, armed with these powers, is intended

to exercise a benign influence to prevent any interference with interstate commerce by stopping the causes of strikes at the source, all of these causes, so far as appears from the Act, being due to the wrongful and unfair acts of the employers.

Supreme Court Decisions Reviewed

The constitutionality of the Act was upheld by the Supreme Court on April

12, 1937, in a series of five decisions, the leading case being that of the *National Labor Relations Board v. Jones & Laughlin Steel Corporation*, involving the alleged unfair practices of the steel company in discharging certain of its employes at its steel plant near Aliquippa, Pa. The company contended that because the employes affected were engaged solely in production activities—the conversion of raw material into finished steel and iron products—and because manufacturing is not commerce, its conduct in such manufacture was not subject to general regulation under the commerce clause.

The Government contended that, because the company produced its raw material—pig iron, coke, etc.—in several States, shipped the raw material to Pennsylvania for manufacture, and then shipped out the manufactured product to other States, either directly to the purchasers or to its own depots in such States, the product of the company was at all times in a "stream of commerce" such as was found to exist in the stockyards cases.

The court took the broader ground that, while acts occurring in the stream of commerce furnish one ground for Federal jurisdiction, any acts, though entirely occurring in one State, which might have the effect of burdening and obstructing interstate commerce, would properly be the subject of Federal control; and it pointed out that the necessary result of a strike at the company's mills would be substantially to obstruct interstate commerce. In upholding the constitutionality of the act and its application to the company's activities, the court recognized that there may be "a host of local enterprises throughout the country" whose activities may have but an indirect and remote effect, if any, on interstate commerce; that the Federal authority must not be pushed to such an extreme as to destroy the distinction, established in the commerce clause, between commerce among the several States and the internal concerns of a State, and that the distinction "between what is national and what is local in the activities of commerce is vital to the maintenance of our Federal system." It also said that the question is necessarily one of degree, and that "whether or not particular action does affect commerce in such a close and intimate fashion as to be subject to Federal control is left by the statute to be determined as individual cases arise."

In the recent case of *Santa Cruz Fruit Packing Company v. The Board*,



the company was engaged in fruit packing here in California. Its alleged unfair labor practices had to do with the union activities of its warehousemen, and resulted in a strike which tied up the plant. The company contended that it was exempt from the Act because the bulk of its fruit was produced in California, and its canning activities were purely local, and that since less than a half (only 37 percent) of its product was shipped out of the State, it was not subject to the Act. The court held that, as the company was engaged in shipping a substantial portion of its product, under f.o.b. contracts to out of State purchasers, it was directly engaged in interstate commerce; that what may affect commerce cannot be determined by a purely mathematical basis, and that the evidence showed that the unfair labor practices of the company did substantially affect interstate commerce.

Circuit Court of Appeals Decisions

The Jones & Laughlin and Santa Cruz cases are the two Supreme Court cases to which we may look in seeking an answer to the question here under discussion. There are several Circuit Court of Appeals decisions to which we may briefly refer. In them the jurisdiction of the Board has been upheld with respect to clay mines and fire brick plants, owned by a subsidiary of a steel company and shipping its product to other subsidiaries in various States; to the operations of the American Potash and Chemical Company, 90 percent of whose product, produced at Trona, Calif., is shipped outside the State; to a Kentucky coal mine which sells all its products to an Indiana company, and delivers its coal to the railroad for shipment to consignees designated by the purchaser; and to a West Virginia cement company, which imported gypsum from other States and sold over 80 percent of its manufactured product in interstate commerce.

Idaho Maryland Mines Case

The one case where a Circuit Court of Appeals has held the Board to be without jurisdiction is that of the Idaho Maryland Mines Corporation, which owns mines in California, and whose product, gold with some silver, is sold either to the Mint at San Francisco or to the refinery at Selby, Calif.; which, in turn, sells to the Mint. The Court held that the Company clearly was not engaged in interstate commerce and that its activities did not

affect such commerce, although the Government ships the gold from San Francisco to Denver. As has already been said, the Board has allowed the time to go by within which to file a petition for a writ of certiorari, and the ruling of the Circuit Court of Appeals is therefore binding on all Federal Courts in the States of California, Oregon, Washington, Arizona, Idaho, Montana and Nevada, which are included in the Ninth Circuit. The decision, while not absolutely binding any other Circuits, would undoubtedly be given great weight in similar cases.

The Labor Board has not, as yet, made any official statement with respect to the case in the way of acquiescing or not acquiescing in the decision. The reluctance of many Federal departments to recognize the binding force of any decision other than that of the Supreme Court is one of the later phenomena of the development of our Federal administrative bodies.

Mining Activities in Interstate Commerce Summarized

From the leading cases referred to, one must assume that the following mining activities are definitely involved in interstate commerce to the extent of being subject to the jurisdiction of the National Labor Relations Board:

1. The coal, iron and other mines and quarries of the great nation-wide producers of steel, aluminum, copper, lead and zinc products; and
2. Any mines or quarries which are operated by companies which themselves market or ship any substantial portion of their products in interstate commerce.

These two groups undoubtedly comprise the major portion, both in tonnage and in value, of the mineral products of the United States, although possibly not in the number of individual mines in the country.

Inasmuch as the courts have frequently held that mining itself is not commerce, it may be suggested that there might be some method of divorcing the actual mining from the marketing or shipment of the product,



through the creation of separate organizations to handle the two operations. The efficacy of any such procedure may well be doubted, for unless the two operations were completely dissociated, as to both ownership and management, the courts in all probability would disregard any apparent diversity of interest, once the true relationship between the separate units were established. Certainly the mere device of operation by subsidiaries would be ineffectual.

Definition of "Substantial Amount" Undecided

The question as to what constitutes the substantial amount of shipment in interstate commerce necessary to bring a local mining activity within the jurisdiction of the Labor Relations Act is as yet undecided. As has already been said, the Supreme Court has rejected the contention made in the Santa Cruz case that at least 50 percent of shipments in interstate commerce was essential to confer jurisdiction, and in a concurring opinion in the lower court in the same case, one of the judges held that if 1 percent of the company's product was shipped in interstate commerce, it would be subject to the Act.

This would seem to be a rather extreme position, and as the statement was not necessary to the decision because the company was in fact shipping 37 percent of its product in interstate commerce, it may not be accepted by the other members of the court. The same court will shortly be called upon to decide the question in the case of the Cowell Lime and Cement Company, which was shown to have imported a small amount of gypsum for use in its manufacture of cement, and to have exported less than 10 percent of its manufactured product.

Numerous Situations Requiring Opinions

There are a number of situations as to which there is no guiding light of court decision, and as to them, an attorney can only venture an opinion. Undoubtedly there are small coal mines whose product is actually consumed in the State where produced, and if the coal were all consumed in homes, there would seem to be no question that such mines would be exempt from the operation of the statute. The same would seem to be true of clay deposits, quarries and cement plants, where all of their products are shown to be used in domestic building.

If coal were consumed locally by an electric plant which was engaged in the interstate distribution of electricity for power and light, the Labor Board would undoubtedly claim jurisdiction, for, in the Idaho Maryland case, it claimed that the activities of the gold mine bore a close relation to interstate commerce, because the Government, the purchaser of the gold, shipped it from San Francisco to Denver. The Board went even farther in that case, for it claimed that gold is the basis of credit, credit is the lifeblood of commerce, and that therefore a cessation of the local production of gold by the respondent would have an immediate and "dire" effect on interstate commerce, and this, notwithstanding the fact that at the time of the alleged unfair labor practices, the Government was keeping all newly mined gold and all gold purchased from abroad out of the credit base, lest it might have an adverse effect on the country's monetary and financial structure.

The question whether or not the courts are going to hold that the activities of A, the producer, are colored through a vicarious connection with the activities of B, the purchaser, after A has parted with all title to or management or control of his product, remains to be decided, as does the question of the existence of any close or intimate relationship between the producer of coal in the case suggested, and the subsequent interstate commerce in electricity of the power plant purchasing and burning the coal. Off-hand, the relationship would seem to be distant and remote.

Operations Seemingly Outside Provisions of Act

It would seem that a mining company engaged in prospecting or in the opening up of a newly discovered seam

of coal or deposit of ore in a single State could not, by the wildest stretch of the imagination, be held to have any relationship at all with interstate commerce, before the company had produced anything for sale.

There are many little mines which sell and deliver their product to local smelters and refiners, which in turn treat the ore or concentrates, commingling the product of a number of owners, and then sell the refined product both in interstate and in local commerce. Such mines should not passively accept any claim of jurisdiction by the Board, for their connection with interstate commerce is certainly not direct, and in many cases is insubstantial.

The case of the Sunshine Mining Company, which produces silver in Idaho and sells its concentrates to a local smelter is a most interesting one. In that case the Board urged as one of its grounds for jurisdiction that because the power company which supplied the mine and smelter with electricity generated some of its power outside of Idaho, although the power generated in that State was far greater than the local consumption, the operations of the mining company had a close and intimate relationship with interstate commerce. That type of argument may be clever and ingenious, but to the ordinary attorney, not versed in the new school of logic, it just doesn't make sense. If the ruling in the Idaho Maryland case is not reversed in some other case, the Sunshine Company would seem not to be under the jurisdiction of the Board.

Bearing of Supplies Purchased on Company's Status

The purchase of supplies outside of State or originating outside of the State has been advanced by the Board in many cases as a basis for claiming jurisdiction. Where the supplies are raw materials which are processed or manufactured into products which are in turn sold in interstate commerce, the contention is undoubtedly sound, but where, as in the ordinary metal mine, the timbers and rail purchased and installed remain in the mine, and the powder, drills and tools are used and consumed in the actual mining, and none of the supplies enters into the actual product obtained, there would seem to be no logical ground on which to sustain the Board's contention.

The Supreme Court has held in one case involving a labor controversy in the building trades in San Francisco, that the mere reduction in the amount

of goods coming into a State as a result of the local blacklisting of certain contractors was a consequence "so fortuitous and indirect" as plainly to cause the activities of a local Industrial Association there complained of to fall outside of the scope of the Sherman Anti-Trust Act. This ruling, if adhered to by the Supreme Court, should be a sufficient answer to the Board's contention that purchases of goods originating out of the State are sufficient to bring local activities within the Federal jurisdiction.

As the knowledge of the writer of the field of mining activities is decidedly local and not interstate, there are doubtless many questions which have not been touched on in this paper, and it is not within the scope of the topic assigned to discuss the wisdom of Congress in limiting the effect of the Act to the alleged unfair practices of the employer, or the desirability of amending the act in any particular respect. Many of us have had the decidedly unpleasant experience of having the Board intervene in situations where the vast majority of our employees have been satisfied and contented, where the management has been fair and decent, and where labor trouble has been started by a few malcontents, sometimes incompetent, sometimes dishonest, but most often just plain ignorant and easily swayed by professional agitators from the outside. When the people come to realize, and Congress is persuaded, that not all employers have cloven hooves, and forked tails in their trousers, and that not all of the labor leaders are entitled to the haloes they claim, the more obvious defects of the National Labor Relations Act and of its administration will be remedied. Let us hope the day will be not too far distant.

Comments on Wage-Hour Bill

There is little one can say at this time about the Wage-Hour Bill. It went into effect yesterday, and in view of the trend of the recent decisions of the Supreme Court its constitutionality, at least as to the minimum wage, will almost certainly be upheld. The jurisdiction of the Administrator will be co-extensive with that of the Labor Board under the Labor Relations Act, and it is the writer's guess that within the next two years most of the States will follow the lead of the Federal Government and adopt similar State wage-hour bills. It should be noted that the act expressly refers to employees engaged in the production of goods for interstate commerce, and

covers, among others, employees "employed in mining, or in any other manner working on such goods." The first interpretative bulletin, however, makes the following concession:

"The Act does not cover plants where the employees work on raw materials derived from within the State and where none of the product of the plant moves in interstate commerce. This is true, even though the product so manufactured and sold locally comes in competition with similar products which have been manufactured elsewhere and have been moved in interstate commerce."

This statement is refreshing and reassuring to those of us who have listened to some of the far-fetched claims of jurisdiction made by the National Labor Relations Board.

The validity of one provision of the Act, that requiring the payment for overtime at not less than one and one-half times the regular rate at which the employee is paid for the authorized number of hours, is at least debatable. In Section 2 of the Act, Congress finds "that the existence, in industries engaged in commerce or in the production of goods for commerce, of labor conditions detrimental to the maintenance of the minimum standard of living necessary for health, efficiency and general well-being of workers" affects commerce in certain specified ways, but, although the Act prescribes a definite maximum number of hours for the work-week, it does not find that any work-week beyond the

specified number is of itself detrimental to labor in any respect. In this respect it differs from the State statutes limiting the number of hours a man may work underground, in bakeries, or in other occupations where the legislature has found longer hours to be detrimental to the health of the worker. Such statutes have generally been upheld as a legitimate exercise of the police power. But this statute negates the idea that a work week of more than 44 hours is detrimental to the health, efficiency or well-being of the worker by authorizing longer hours if the worker is paid time and one-half for overtime.

If two mines are both operating on a 48 hour week basis, and mine owner A pays his men 25 cents an hour for 44 hours, and 37½ cents an hour for the other four hours, a total of \$12.50 a week, the letter of the Act has been complied with, and A is an honest, law-abiding man; but if mine owner B pays his men a straight 50 cents an hour for 48 hours, a total of \$24 a week, the Act has been violated, and B is a law-breaker, subject to a fine of \$15,000 and six months imprisonment for every man he employs for every week that he pays his men almost twice as much as the honest A has paid his men. If that makes sense, just try to convince the man who works for A that his boss is a better man than B, who pays his employees almost twice as much as A does.

The fact is that many mines are paying far more than the minimum

wage prescribed in the Act, and are paying all they can afford to pay and continue in business; that the men are willing and anxious to work 48 hours, and have bought homes or automobiles on the assumption that their weekly wage will be so much, and that a reduction of their work-week would seriously affect their budgets.

If the employer were to reduce the base pay for 44 hours to a basis which would enable him to pay time and one-half for the four extra hours, the employee's wages would be substantially reduced for any week in which the employee had to lay off for a day or even half a day; yet, if this provision of the law is valid, many employers will have to reduce their base rates of pay to conform to an absurd mathematical formula. If the employment of a six-dollar a day man for 48 hours a week is lawful under any circumstances, certainly it cannot be said that the last 4 hours' work is lawful if the man gets \$4.50 for a half-a-day, and is unlawful if he only gets \$3; while a two-dollar a day man may lawfully work the same 4 hours for \$1.50.

There might possibly be some logic in the time and a half provision, if it were limited to one and a half times the prescribed minimum wage, but the writer is of the opinion that the provision as it now stands has no rhyme nor reason behind it, and that the courts will ultimately hold it to be arbitrary and capricious, and so invalid.

Preview of Greatest Mining Exhibit

What has been termed the greatest and most spectacular mining exhibit in the history of the world is now being assembled and constructed in the gigantic Palace of Mines, Metals and Machinery on Treasure Island for the 1939 Golden Gate International Exposition in San Francisco, Calif. Plans for the display, made by Mining Exhibits, Inc., include construction of Treasure Mountain, the focal exhibit that will enable the laymen to obtain first-hand knowledge, under ingeniously-simulated conditions, of actual mining operations.

Entrance to Treasure Island will be through a passageway resembling the tunnel of a mine. Emerging, the visitor will find himself in a valley between two towering mountain ranges in a typical mining region.

Color and lighting will give the exterior scene a deep perspective.

From the valley one may see the reproduction of the open cut copper mines of Utah, Arizona and Colorado; a replica of the Mother Lode country; and models, actually working, showing surface mining operations, such as panning, cyaniding, flotation, hydraulic mining and dredging.

In Treasure Mountain visitors will see miners operating drills and mucking machines. They will see trucks, cars and hoists handling ore. Even water will seep slowly through the tunnel roof, to make the underground illusion a perfect one.

Another feature of the exhibit will be a full-sized, operating gold mill. The precious metal will be extracted daily from 25 tons of ore sent from the Mother Lode country. First, the gold-bearing ore will be "salted" in Treasure Mountain for "mining."

From there it will be taken to the mill by miniature railroads where spectators, from several vantage points, may observe mill operations.

Twice a day spectators may obtain the vicarious thrill of a spectacular mine explosion. Fire, dust and smoke will belch from a mine shaft, and a rescue crew from the United States Bureau of Mines will go into action to "save" the "imprisoned" miners. Special rescue contests will be staged during the exposition. Among teams participating will be a famous Igarot squad from the Philippines.

Three mining companies from the Philippines will show all phases of mining in the Commonwealth, ranging from the primitive gold extraction methods employed years ago by natives to the modern methods now in vogue. A native iron smelter, such as the Filipinos used centuries ago, will also be seen in operation.

THE RIGHT TO MINE— Its Protection Against Encroachment*

THE subject which I have been asked by the officers of the American Mining Congress to discuss today is so broad in its scope that an encyclopedia might easily be written to cover it. The right to mine dates from the time when Neanderthal man, by the use of brute force, carved from the rocks a suitable stone hatchet and used the product of his labor to enforce his rights if his neighbor objected to the operation. It is a long step from this simple law of might down to the time when the Federal Government says to the mine operator, "Go to jail," if you say good-morning to a competitor, because you are violating the anti-trust laws; or "Go to jail," if you say good-morning to your employes, because you are violating the Wagner Act. The right to mine—that is, to extract minerals from the earth—is one of the earliest privileges sought after and enjoyed by the human race. Its regulation has likewise been a matter of age old legislation.

Regalian Doctrine Developed in Europe

On the continent of Europe the so-called regalian doctrine existed, under which the ownership proper of all metals was vested in the sovereign. This was particularly true with respect to gold and silver. This regalian doctrine also prevailed as to gold and silver mines under the common law of England, but as there were no gold and silver mines in England it did not have so much bearing there. Other minerals were held to be the property of the owner of the land under English law. Where the regalian doctrine prevailed, the right to mine was contingent upon the payment of a royalty to the crown and making arrangements with the owner of the surface for mine operation. Outside of exacting this royalty, history does not indicate that the sovereign was particularly interested in regulating the miner's means and method of opera-

* Presented to Metal Mining Convention of the American Mining Congress, Western Division, Los Angeles, Calif., October 24, 1938.

● Threatened by Burdensome Laws, Mining Must Defend This Right by Effective Organization

By ROBERT M. SEARLS

Attorney
San Francisco, Calif.

tion. Means, methods and customs of mining developed in the coal mines of the Black Forest, in the iron mines of Bohemia, in the tin mines of Cornwall, in the lead mines of Devonshire, and elsewhere, until, with the advent of the machine age and all the modern equipment of mining, we have the complex operations of the present day.

Early Leasing Plan in U. S. Unsuccessful

In the United States little attention was paid to the regulation of mining for many years. While gold had been found in moderate quantities among the Indian tribes of the southern States, and copper was known to exist in the Lake Superior region, little metal mining was done by white men on the North American continent prior to the year 1800. The one possible exception to this statement is the mining of lead in what is now Missouri as early as 1720. In 1807 Congress passed an act reserving lead mines in Indiana territory for lease by the Federal Government. Leasing was done under the supervision of the War Department on a 6 percent royalty basis. The leasing plan was not a success. The frontier country was settled up. Illegal entries of mineral land were made under agricultural laws, the smelters and miners refused point-blank to make any further royalty payments, and the Government was unable to collect them. In 1847 it was finally concluded that the only practical solution was to sell the mineral land and do away with all attempts to reserve royalties on lead or any other metals, since they had only been a source of embarrassment to the Department. This decision was fol-

lowed by the Act of March 1, 1847, for the sale of mineral lands in the Lake Superior district, in Michigan and in Wisconsin. We thus see how our early forbears in the mining industry reacted to Federal regulation.

The discovery of gold in California in 1848 precipitated another controversy. California, prior to its cession, had been under Mexican law, rules and customs. The cession of the state to the United States following the war in 1848 with Mexico came just prior to the discovery of gold. The result was that the placer diggings in early California rapidly filled up with a large influx of miners from all over the world, each bringing his own ideas of laws and customs. The Mexican idea of appropriation by the discovery of mineral was adopted as a basis for procedure in the various camps.

Development of Local Rules in California

Miners from Cornwall soon spread themselves through the State and, largely by their experience, practical sense and industrious habits, helped to evolve something like a system of rules and regulations, which was embodied in the district rules and regulations of miners. The substance of these rules was enacted in the Civil Code of the new State of California following its admission in 1850. But the State could not vest titles as against the Federal Government.

Mining Acts of 1866, 1870 and 1872

In December, 1849, President Fillmore recommended that the mineral lands in the far west be divided into small parcels and sold under such re-

strictions as to quantity and time as would insure the best price and guard most effectually against combinations of capitalists to obtain monopolies. However, Congress did nothing about the matter until 1866, when the first lode mining act was passed covering operations on public lands. The miners rules and customs which had been in effect for 16 years were given express recognition and the status of statutory law. The only regulations contained in the act related to the manner and means of acquiring title.

This act was not an entire success because it did not adequately determine the rights of the miner as compared with those of the surface owner. It was superseded by the Placer Act of 1870 and the present lode law of 1872. These acts provided the ways and means by which the miner might become vested with a fee title to his land, having all the dignity and characteristics of any other land titles, with the exception that following the miners' custom, extralateral rights were declared to be appurtenant to the claims in which the apices of the veins were found.

Right to Mine Vested in Landowner Without Royalty

It may therefore be said that since 1872 the metal miner has, so far as title to his land is concerned, enjoyed a position comparable and in some respects even superior to that of the owner of a non-mineral title. The right to mine, so far as the Government was concerned, was vested in the land owner without royalty and without limitation except such as might be common to all industries, when once the purchase price of the land had been paid. Therefore, with respect to titles, we may say that the Government did all that it could or should do to encourage the mining industry. There are many other factors, however, which vitally affect the right to mine. One of them is taxation.

Influence of Taxation on the Right to Mine

The application of the property tax to mining lands was the natural sequence of the establishment of orderly government in mining regions. It is a form of taxation to which all American citizens are accustomed. Where it is reasonably applied the mine owner has never been in the least unwilling to bear his share of the cost of government as levied under this

form of taxation. There has been a tendency in the counties of California in which oil is produced for the assessors to separately assess mineral rights which are often held under leases, on the basis of past year's production. This is in effect the levy of a severance tax, of which I shall shortly speak. It is clearly not a proper measure of the value of the mineral rights because the mineral which has been produced is no longer a part of the property, and the property is that much less valuable. However, this practice is followed in a State which has as yet no severance tax applicable to the production of its natural resources, and so far as I am advised this method of assessing oil lands is not followed in other localities where metals are produced.

The problem of fairly assessing mine property for tax purposes is a broad



ROBERT M. SEARLS

one, requiring consideration by the local taxing authorities of the past history of the property, the average value per unit of ore that has been produced, the probable value in the ground of ore that is left, and the general policy of encouraging mining industries in a given section by a conservative assessment policy.

Levy of Severance and Property Taxes Contrary to Established Principles

So far as metal mines are concerned, I do not believe that there is much to complain of concerning the property tax except in those States where it is levied in addition to a severance tax. It seems clear that a State should not levy both a property tax and a severance tax because to do that amounts to double taxation of the same property. Mining property seldom has any substantial value except for the min-

erals it contains, and if the State by a statute levies a severance tax on the right to extract those minerals based on a percentage of their gross value—as is usually the case—it is certainly double taxation to again assess the property for local taxation on a property value basis. This is contrary to established principles of taxation.

The next form of tax commonly imposed on mining companies was the corporate franchise tax, which is in effect a State income tax on the mining company's net income. Here again the mining industry has no particular complaint because it bears a rate common with all other industries, provided that the State authorities allow, as they usually do, a reasonable deduction for depletion of wasting assets in computing the net income.

Another burden was then laid on the industry in some States in the form of sales taxes on all materials and supplies consumed, and use taxes on machinery and equipment purchased outside the State. In California one attempt was made to include gold bullion in the list of taxable sales, but it was defeated by legislators friendly to the industry after a vigorous protest by the mining organizations.

Federal Corporate Income Taxes

Following these taxes we have Federal corporate income taxes, to which I shall not go into detail except to point out in passing that the corporate undistributed profits tax just modified by Congress had a highly detrimental effect on the expansion of mining. With no opportunity to obtain an exemption from taxation of surplus earnings applied to capital expenditures in equipping and developing mining property, a penalty was placed on the accumulation of corporate surpluses which make the expansion of mining possible. It is to be hoped that the present modification of this law will be retained and even extended so as to eliminate such an unjust form of taxation as the undistributed profits tax altogether.

Objectionable Features of Severance Tax

Another recent form of taxation affecting mines has been the severance tax levied by various States. This tax goes back to the regalian theory that the metals belonged to the sovereign, not to the owner of the soil, and that the right to extract the same is an appropriate basis for taxation. In modern days it is sometimes twisted

into saying that the natural resources belong to the people; that the exhaustion of these resources depletes the people's wealth, and that the people should receive a share in the form of taxation.

The utter fallacy of this reasoning under the American system of absolute title to the minerals being vested in the owner of the surface is apparent. There is no more justification for taxing the miner for the privilege of extracting the mineral from his land than there is for taxing the farmer for the privilege of raising wheat on his. To this, the proponents of the severance tax say that the farmer does not destroy the taxable value of his land, while the miner does. This contention is easily answered—the miner by his diligence and enterprise adds to the surface value of land containing minerals a temporary mineral value which it never had before. Under the property tax laws he is taxed on that additional value during the period that the minerals are being extracted and sold. After they are gone, the temporary value no longer exists and the land reverts to the surface value which it always had; and there would have been no temporary value except for the minerals that were contained and extracted. If the minerals were left in the ground and could not be extracted, it obviously would not have any value for mineral purposes.

This is true for all forms of mining except hydraulic mining and dredging, which may destroy small surface values, and it is equally true for lands found to contain oil. A severance tax added to a property tax is therefore a rank discrimination against the miner and an unjust encumbrance on the right to mine. South Dakota has perhaps the worst example of discriminatory taxation, with a 6 percent gross bullion tax, exempting the first 10,000 tons of ore mined annually. It is obviously aimed at one large operator, and is levied in addition to the general property tax.

In some States the severance tax is justified as a lieu tax—that is, in place of property taxes; but the objection here is that it becomes a special tax on a limited industry, and once imposed, control over the rates rests exclusively with the legislature. They may be placed entirely out of line with property tax rates, with the miners politically helpless to protect themselves. The general taxpayer who is not affected by the tax will ordinarily not be interested unless his purse is also tapped. This is the great

objection to special forms of taxation like the severance tax.

Other Severe Legislative Restrictions Affecting the Right to Mine

Another qualification on the right to mine in recent years has been the constantly expanding exercise of the police power by both the State and Federal Government. Starting with the anti-debris law, which practically ended hydraulic mining in California for 40 years, and continuing on through all the range of laws limiting the hours of labor in underground mines, directing the payment of wages, imposing regulations for the safety of employees, providing compensation and social security insurance, prohibiting or regulating the pollution of streams from mine tailings, and regulating the terms upon which securities for the financing of mines may be offered and sold, the right to mine has been severely trammelled with legislative and administrative restrictions of many kinds and descriptions. Some, but far from all, of these regulations have become necessary in a modern age to correct abuses which have grown up, and to protect the lives, health, and well-being of citizens. Up to about two years ago most regulations were imposed by state laws and were enforced by state officials cognizant of and familiar with the industrial problems that confronted the mining industry within their borders.

Severe Federal Regulations a Serious Threat

Commencing with the enactment of the Wagner Act and continuing through the Securities Exchange Act, and now the Wage-Hour Act, the Federal Government has stepped into the picture with a heavy tread. No longer may the miner rely upon practical and sympathetic consideration of his individual problems. Arbitrary policies fixed in Washington, often adopted in conference committees of Congress where he has no opportunity to be heard, enforceable with atrocious penalties—both civil and criminal—threaten the very existence of the metal mining industry.

The operator may not deal with his own employees or sometimes even with the union of their own choosing, if the National Labor Relations Board in its supreme discretion considers that a C. I. O. union would be a better bargaining agency. The operator is informed under the new Wage-Hour Act that although he is carrying on a continuous process industry, he may not work

his employees more than 44 hours a week now, and in a couple of years 40 hours a week without paying them time and a half for overtime.

On what valid theory of exercise of the power to regulate interstate commerce can this enactment be justified? Conceding for the purpose of argument that wages up to the 40 cents per hour maximum enforceable by law under the act should be paid as necessary for the health, comfort, and well-being of the workers; conceding, for the purpose of argument also, that a 40-hour week is necessary for the well-being of the workers and the curing of unemployment, or a 35-hour week, or a 30-hour week, if the latter will please some of our labor friends better—*what possible justification* is there for permitting a violation of these maximum hours *upon the condition that you pay employees time and one-half for the overtime?* If wages exceed the present and even the ultimate minimum prescribed by the act, and if the regulation of hours to any specified number in the interests of health, safety, and nation-wide unemployment is a valid exercise of the power to regulate interstate commerce, how can Congress justify a departure from this standard upon the condition that time and one-half shall be paid for overtime??

In my humble opinion the provisions of Section 7 of the Wage-Hour Act are a violation of the constitutional limitation on the powers of Congress and cannot be supported as a valid statute under any known theory of exercise of those powers in the United States. Those who would continue to enjoy the right to mine should stand shoulder to shoulder in a demand that this outrageous imposition on industry be modified so as to permit its continued existence in compliance with law.

Hand in hand with the Wagner Act and Wage-Hour law, have gone Social Security laws and tremendous increases in compensation awards for injuries. These indirect costs of mine labor in California under these latter laws is nearly 15 percent of the payrolls—in an industry where increased costs must be absorbed because they are producing gold which they sell at a particular price and which cannot be passed on.

Difficulties in Mine Financing Under S.E.C.

The Securities Exchange Act is another highly troublesome impediment to the exercise of the right to

mine, particularly by the small operator who desires to finance development of his property through a public offering of capital securities. Designed by its framers to protect the investing public against nation-wide flotation of spurious securities, the commission organized to administer the act has with usual Washington sangfroid passed out regulations by the hundred, without any regard to their necessity, desirability or the cost of complying with them. Statements are required necessitating the employment of certified accountants, engineers and attorneys at a cost which is in many instances prohibitive to the small operator.

The need for these statements is not clear. Mining is at best a speculative venture. The people who buy mining stocks in new mining ventures know that they are going into a speculative type of investment. Assume that the promoter may be and should be held criminally responsible for making false statements in his prospectus which are not warranted by facts within his knowledge. Assume, also, that neither he nor any one else can tell with any assurance whether or not he is going to find ore in his development, and if he does find it whether or not it will be a paying venture. Wherein is the public benefited by the opinion of a mining engineer as to whether or not he will be successful, the certification of a public accountant that his books have been properly kept, and the opinion of an attorney that he has legal title to his land? Any one of the three experts may be wrong.

If the Securities Exchange Commission approves the issue it will be just that much more inducement for people to put their money into mining securities who would not embark on such a hazardous investment were it not for the certificate of some government commission. My point is that the permit of the Securities Exchange Commission adds very little to the safety of present day mining investments, and is apt to create a false sense of security in the prospective investor. Each of the states has its own blue sky law and its own corporation commissioner whose permit must be obtained before such securities can issue. Mining securities have not been the worst offenders on any of the country's major exchanges. It would seem that the Securities Exchange Commission might well justify more leniency in its permits to mining operators than the past has indicated.

I have outlined in brief detail the history and development of restrictions on the right to mine. The mine

operator has been caught in the current of this experimental social regulation which permeates our whole governmental structure in this present day. He is embroiled in the clash of philosophies which rocks America and, indeed, the whole world. The gold miner in particular is badly hit because he cannot add the cost of this regulation to the price of his product. The miners of other metals are not much better off because they must compete in the world market with producers who are not subject to this expensive regulation. The ultimate solution no one can foresee.

One thing seems sure, however. Metal mining will always require large capital investment. Capital will not work in a hazardous enterprise indefinitely without adequate compensation. If our properties are shut down the ores will still be in the ground, and the capitalist can in most instances bide his time to extract them. But how about the workers—the hundreds of thousands of employes in metal mining? How about the local merchants in the sparsely settled country in which these mines operate? How about the entire localities of people which their enterprise supports? Here is where confiscatory regulation will back up on itself and result in an outcry to which Washington and the state legislatures sooner or later must give ear.

Hopeful Signs on Horizon

There are already hopeful signs. Vehement protests are becoming stronger and stronger against the unfair and highly discriminatory decisions under the Wagner Act, the hampering provisions of the Wage-Hour Act and the discriminations of the tax laws. The Circuit Court of Appeals of this circuit, in a courageous and well-reasoned opinion, has held that the Wagner Act does not apply to a purely intrastate industry like gold mining. The decision has become final, due to the Government's failure to ask for review by the United States Supreme Court.

The strong argument against the enactment of the Lonergan stream pollution bill which was voiced by the American Mining Congress, in

conjunction with other industries, blocked its enactment. In every state the mining industry is organized as never before to fight for its existence before legislators and administrative tribunals. Its associations have for the most part made the American Mining Congress their spokesman and voice in Washington, and one cannot speak too highly of the splendid work done by Mr. Julian Conover and his associates before congressional committees and administrative tribunals. Cooperation and organization are beginning to get results.

The industry must forget some of its individualism—must cease to be an industry of separate units merely because most of its members are geographically widely separated. It must speak to and act toward the administrators of a democratic government so vigorously that law makers and administrative tribunals alike will recognize the justice of its contentions. The mining industry asks for nothing more.

The right of American citizens to mine must not cease to exist. It should and must continue in the future, as it has in the past, as one of the most important factors in meeting the material demands of our modern civilization.



Effect of the CANADIAN TREATY on the TRI-STATE DISTRICT

EDITOR'S NOTE: *The following analysis by Mr. Just comprises a clear statement of the effects of the recently concluded Canadian trade pact on one important zinc mining district. Publication of this is particularly timely in view of his fair and impartial address on the Trade Agreements Program presented at the Los Angeles Metal Mining Convention and published in the November MINING CONGRESS JOURNAL.*

By **EVAN JUST**
Secretary, Tri-State Zinc &
Lead Ore Producers Assn.

acts to impair our self-sufficiency with respect to a critical war material, while it simultaneously plans to spend more billions for national defense.

Price Cuts a Direct Result

Briefly, what has been done? The tariff on zinc has been lowered 0.35c from 1.75c to 1.40c per pound. The duty on the zinc content of concentrates has been lowered from 1.50c to 1.20c, a drop of 0.30c per pound. This reduces the protection on the metal recoverable from our concentrates \$3.57 per concentrate ton. It reduces our protection against importation of concentrates by \$3.60 per ton. Since 1935, we have had to utilize the full protection of the tariff to supply our market in the face of threats of importation. Under these circumstances it is inevitable that our prices will fall by the amount of the duty reduction and that imports will capture a portion of our market. The only circumstance likely to prevent this would be a boom in the foreign market, which we have no reason to expect.

Immediately after announcement of the treaty, and as a direct consequence, the price of zinc dropped from 5.05c to 4.75c per pound. The price on our concentrates fell \$3 per ton from \$34 to \$31.

Effect on Production

Our 1937 production of combined zinc and lead concentrates was about 10,000 tons per week. During the nine weeks of the current year when prices were at the level to which the trade treaty has reduced them, our average production was 6,697 tons per week, a drop of 33 percent from the 1937 level. This amount is 13 percent of the national production. It is evident that the State Department

has handed over one-third of our market and not less than 20 percent of the national zinc market to foreigners. This blow has been dealt us at a time when zinc concentrate prices were 16 percent below the average for the past 30 years. The 30-year average price has been \$40.32. The average price during 1938 to date has been \$30.38. The price before announcement was \$34. By the cut our prices are brought 23 percent below the 30-year average.

An investigation of mining costs makes it easy to understand how an arbitrary cut of \$3 per concentrate ton will affect our industry. In mining, our average profits over the past 10 years have been 88.4 cents per ton, or one-fourth of the drop in price caused by the trade treaty. At no time during 1938 have our average mining profits equalled half the price cut. Normally, one-fourth of our production comes from tailings re-treatment. At the current wage scales, there is hardly a tailings operator who can make a profit when zinc concentrates sell below \$31 per ton. Obviously, some of our producers will have to shut down unless they reduce wages. These facts were known to the State Department and their action, notwithstanding, is incredible to us.

Workmen Will Suffer Most

The worst sufferers will naturally be our workmen. During the recent recession the industry was able to keep a large portion of its men employed, but only by dint of two or three day work weeks. This arrangement, although it prevented starvation or going on relief, reduced the scale of living to the barest essentials. When operations expanded in the fall so that we were approaching a full work week, the wage-hour act forced
(Concluded on page 52)

THE hundred thousand people of the tri-state zinc and lead mining district of Oklahoma, Kansas and Missouri have been stunned by the action of the State Department in including zinc and zinc ores among the tariff concessions extended by the United States in the recent trade treaty with Canada. Zinc mining is the backbone of our industrial life. Through the several months of the recent business recession our miners have eked out a bare subsistence by working two or three day weeks. Now, just when better times seem at hand, we are dealt a crushing blow by our national administration, that sets our prices back to the recession levels, and will affect production, wages and employment accordingly.

Why, we ask ourselves, have we been selected as a sacrifice? We know that many commodities on the tentative list remained unaffected even though their cases against being touched were less meritorious than ours. We know that the State Department and the White House were fully informed as to our predicament. If we have been sold down the river to benefit some other trade groups, we are forced to the unwelcome conclusion that the time has arrived in this country when minorities have no rights. Certainly it cannot be said that the final consumers of zinc products will benefit from our loss, as the reduction in cost of the zinc in these products is insignificant.

We deem it peculiarly inconsistent that the administration deliberately



PERMISSIBLES

The day after election, there appeared on the bulletin board of the National Press Club, rendezvous of the Capitol's press corps, the following memorandum: . . .

"For Sale Cheap—One mandate from the people. Apply F. D. R., White House." . . .

Two Congressmen, one an ex and the other in Washington early to look over the office suite he was soon to occupy, were heard arguing bitterly. . . . Shouted one: What do you mean I stole the election. . . . I paid cash for it, didn't I? . . .

A friend of ours told us the other day that he wouldn't mind the certainty of death and taxes if only they would come in that order. . . .

That old song about "there's always something doing down on the farm" is particularly true nowadays with a Federal crop counter hiding behind every bush, a WPA actors' group using the barn and Republicans staging a rally out in the cornfield. . . .

It's true enough, maybe, that the world owes everybody a living, but what is it going to use for money if it ever tries to pay off? . . .

The football season reminds us that the New Deal is a lot like some of those lucky teams. . . . At crucial moments the wind is always at its back and the other side does a lot of fumbling. . . .

In New York recently WPA workers staged a strike because they said it was unfair to expect one man to use both a shovel and a pick. . . . Just goes to show what this age of specialization has brought us to. . . .

A generation ago our fathers thought the G.A.R. was going pretty strong in its pension claims. . . . It's a good thing the G.A.R. didn't have its headquarters in California. . . .

Wage-Hour Administrator Andrews, reporting to the President on the fact that the new law has thrown from 30,000 to 50,000 out of work, explains that most of them were only marginal or handicapped workers anyway. . . . Yeh, but those marginal and handicapped workers like to eat too—and so do their wives and children. . . .

Well, Harry Hopkins hasn't said that the grand jury in New Mexico which indicted 40 officials for WPA irregularities didn't know what it was doing. . . .

At the recent Press Club dinner at which the President was an honored guest, one speaker made the remark of the evening. . . . He described the recent election results as "mutiny on the bounty." . . . The President laughed too. . . .

The Committee of Americans is advertising to make more people conscious of taxation. . . . Those who aren't conscious of it by this time must be unconscious. . . .

Ernest Thompson Seton, a widely known naturalist and advocate of Indian rights, is sponsor of a move to give back to the Indians a great slice of the Great Plains, now better known as the dust bowl. . . . It's a good idea but the Indians would probably expect something in addition for damages. . . .

It's nice to hear about the old timer who tells you he can remember when he could buy a pound of steak for a dime. . . . But he forgets to add that he had to work an hour to earn the dime. . . .

An eminent doctor reports that one out of every three married couples are childless. . . . It's time the Administration did something about that. . . . Here we're piling up a public debt for future generations to pay, and some people are slackers in failing to provide a generation to pay it. . . .

What's going to be done to lick the depression when all the stadiums and municipal auditoriums are built?, asks a critic of spending. . . . Well, we could begin tearing them down. . . .

A western correspondent writes us of a sign warning sportsmen near Fairdale, Oreg.: "Warning to Hunters—Don't Shoot Until U See It Move—It Might be a W.P.A. Worker." . . .

The newspapers didn't admit it, but there was probably a mistake in the headline which said that voters' views are being sought. . . .

It looks as though relief and politics are going to be divorced in New Mexico, but there won't be any charge of non-support. . . .

Well, at last Uncle Sam and John Bull have signed a trade treaty but long experience with treaties indicates that it may turn out to be more treaty than trade. . . .

A clergyman once wrote "The History of the Law" in 700 words. . . . He's the man Congress ought to hire to draft some of the new laws. . . .

And, in conclusion, it must be a wonder to most people why persons who know exactly how to run the world write magazine columns instead. . . .



WHEELS of Government

MONTHS ago astute observers of the conduct of national affairs in recent years declared that the British-Canadian Foreign Trade Agreement would not be announced until after the November elections. From the first they discounted the informal expressions emanating from the State Department and the Committee for Reciprocity Information that the treaties would be made public late in May or early in June. True it was that such was the belief of the American, British and Canadian negotiators in the early stages of the work, but they reckoned only within their own duties and not with political causes and effects.

When the results of the November elections are reviewed, it is easy to understand why those who guide the destiny of the present Administration were unwilling to have such a sweeping revision of the Tariff Acts of 1930 and 1922, as is contained in the British-Canadian treaties, made public in time for the voters of the country to realize what was happening. While the election results in the New England States, New York, Pennsylvania and Ohio may be regarded as a normal return swing of the pendulum the Democratic upset in the cornbelt states and in the stock-raising regions gave notice of a definite dissatisfaction toward Administration acts and programs. If the fisheries of the East and West Coasts, manufacturers of the North, the farmers and stock-raisers and the raw material producers of the Central Valley and the far West had known what was to be in the British and Canadian Trade Treaties the results in the congressional elections would have been more, indeed much more, of an upset than the one which actually took place.

As it is, the Republicans gained 81 seats in the House of Representatives, eight seats in the Senate, and 11 state governorships. As the lineup now stands, the House will be made up of 262 Democrats, 170 Republicans, one Farmer-Labor and two Progressives. In the Senate, 69 Democrats, 23 Republicans, two Farmer-Labors, one Progressive and one Independent.

● As Viewed by A. W. Dickinson of the American Mining Congress

The trade agreements with the United Kingdom and Canada will become effective January 1, 1939, and will have a life of at least three years, continuing indefinitely thereafter unless notice of termination is given by either of the parties to the treaty. The domestic producers of metals and minerals receive no direct benefit from the treaties with the possible exception of the removal of the 3 percent Canadian excise tax, which will result in a reduction on our domestic bituminous and anthracite coal entering Canada in amounts varying from 8 to 20 cents per ton. In the Canadian treaty substantial reductions were made in our protection against imports of bentonite, feldspar, mica, aluminum, cadmium and zinc; and in the British treaty on magnesium oxide, lead pigments, clays, fluorspar, graphite, pig iron and chromium. Zinc ores were reduced from 1½ cents per pound to 1 1/5 cents; and slab zinc was equally hard hit by a reduction of from 1¾ cents per pound to 1 2/5 cents. This reduction is particularly serious in marginal districts where there is no precious metal co-product to help bear the load.

Taxation

Evidence of Administration cognizance of the election returns was indicated in the appointment by the President of an Economic Policy Committee made up of the more conservative Administration officials to study the fiscal status of the Government. Also during the President's stay in Warm Springs, Ga., Senators Barkley, Harrison and Bankhead, Representatives Doughton, Rayburn and Speaker Bankhead, as well as Secretaries Morgenthau, Ickes and W.P.A. Chief Harry Hopkins will confer with him.

Indications have come from Secre-

tary of the Treasury Morgenthau and other Administration sources that there may not be a general Revenue Bill in the coming session of Congress. The excise taxes expiring in June could be continued by joint resolution as in previous years, and while it will be remembered that the President refused to sign the Revenue Bill of 1938 because of his desire for the continuance of the undistributed corporate earnings tax, it is reported that the opposition to the renewal of this measure is so strong that such a move will not be attempted. It has been announced that the first work of the House Committee on Ways and Means will be on amendments to the Social Security Act. At this time, there is no Subcommittee of the Committee on Ways and Means to consider and prepare for a Revenue Bill of 1939, and it is understood that no such Subcommittee will be appointed, at least until the Congress convenes and the full Ways and Means Committee is organized.

Due to resignations and to the election, one-third of the places on the Ways and Means Committee are now vacant. Representatives Vinson, Sanders, Lewis, Lamneck, Fuller, Thompson and Wearin of the Democratic side will not return, nor will Republican member Thurston. The Committee normally has 25 members, and with the changes in the Democratic-Republican House ratio occasioned by the election it is believed that when Committee members are elected by the caucuses this year there will be 16 Democrats and nine Republicans.

Late in November a Senate Finance Subcommittee began hearings on industrial profit-sharing plans. The study was authorized by a Senate resolution in the last session, and embodies the ideas of Senators Herring of Iowa and Vandenberg of Michigan for the encouragement of such plans through

what has been termed "incentive taxation." Prominent executives from the Eastman Kodak Company, Proctor and Gamble, Sears Roebuck, Curtis Publishing Company, Westinghouse Electric and other large enterprises appeared to explain the plans in use for the employes of their companies, while President William Green of the American Federation of Labor spoke in opposition of both profit-sharing plans and any incentive taxation measures which might encourage their use. The majority of the industrial witnesses did not advocate incentive taxation as a means of encouraging profit-sharing, but the Subcommittee is continuing its inquiry along the lines of encouraging capital expenditures for the expansion of industrial activity and the increased employment of workmen.

Wage-Hour

The original plan of Administrator Elmer F. Andrews of the Wage-Hour Division, Department of Labor, for 12 permanent regional offices has been put into execution only in part because of lack of appropriations. Up to the present time regional offices have been established in Boston, Washington, Chicago and San Francisco.

During November, the fifth National Conference on Labor Legislation met in Washington with Secretary of Labor Perkins. Made up largely of the Labor Commissioners of the states the Conference worked on plans for uniform State Wage-Hour Laws to operate with the National Fair Labor Standards Act of 1938. In speaking to the Conference, Administrator Elmer F. Andrews said "the Wage and Hour Division looks forward to the time when each state will be equipped to take over all investigations and inspections in connection with the Administration of the Wage and Hour provisions of the Fair Labor Standards Act." The Administrator further asked the cooperation of the various state labor districts in (1) reporting to the Wage and Hour Division on situations that appear to be in violation of the Federal Act; (2) providing lists of low paid industries and establishments; (3) distributing official rulings and interpretations from the Washington office; (4) referring complaints to the Wage-Hour Division on forms to be furnished by the Division, and (5) referring requests for interpretations of the Act to the Wage-Hour Division.

The Division is reported to be moving very carefully toward the work

of enforcement of the Fair Labor Standards Act and to be making exhaustive investigations of some of the complaints of violations. A number of the complaints brought in by the State Labor Commissioners were from workmen in mines as well as in other industries who have found that their weekly earnings have been decreased through the compliance of industrial managements with shorter hours prescribed by the law.

Monopoly

Set to begin on December 1, the hearings before the Temporary National Economic Committee investigating business conduct and procedure will first consider what is described as a factual study of the entire national economic system by Isadore Lubin, Bureau of Labor Statistics, Department of Labor; Willard Thorp,

Department of Commerce, and Leon Henderson, Executive Secretary of the Committee. The material which they will present is intended by the Committee to demonstrate how production and distribution methods have functioned in the economic growth of the United States. During the following three weeks the Department of Justice unit of the O'Mahoney Committee will present witnesses for the purpose of developing the story of the so-called "patent pooling" in the automobile and glass container industries. Commentators express the belief that the testimony on this use of patents by the automobile industry is intended to show the benefits in such practices to the national economy. In the case of the glass industry it is reported that some members of the Committee take a different view of the results of patent pooling.

(Concluded on page 52)

Thanksgiving snow screen at the White House

—Horydezaik





NEWS and VIEWS

Mather Washery Completed

One of the largest and most modern coal washing plants in western Pennsylvania went into operation November 15 when construction work on the 4,500 tons daily capacity plant of the Mather Collieries Company, 7 miles east of Waynesburg, was completed.

Modernization of the tippie included crushing, picking and loading facilities for some 400 tons per hour of run-of-mine coal; reinforced concrete blending bins of 1,500 tons capacity; and a combination wet and dry coal cleaning plant of modernistic reinforced concrete construction, including improved Hydro-Separators for washing 3-in. x 5/16-in. coal, and stream-lined air-flow cleaning units for dry cleaning 5/16-in. x 0 coal. Total capacity of wet and dry units will be 300 tons per hour.

The Roberts and Schaefer Company were the builders, and all of the company's improvements in design and construction, including 100 percent dust-proofing, were incorporated in the plant.

American Smelting and International Reopen Units

Reopening of the lead smelter of the American Smelting and Refining Company at its Murray plant, idle since last May, was announced on October 27 by William J. O'Connor, manager of the Utah department of the company. The reopening gives employment to some 300 men, and the plant's continued operation will depend on the amount of ore received for treatment, according to Mr. O'Connor.

Reopening of the Mountain City Copper Company mine, located at Mountain City, Nev., on November 1 enabled the International Smelting and Refining Company to resume operations at the copper smelter at its Tooele, Utah, plant. Announcement of this move was made by C. F. Kelley, president of Anaconda Copper Mining Company, of which International Smelting is a unit.

Mr. Kelley further stated that the



The Ray Branch of Nevada Consolidated Copper Corporation at Ray, Ariz., has recently doubled its output at the Ray mine, thus increasing the operating schedule at the company's Hayden concentrator. Shown above is the company's No. 1 shaft at Ray, used for hoisting ore, and at right the old Ray Central shaft where relatively high grade ore was produced.

Owing to the increase in production at Ray, fires were lighted in mid-October at the Hayden smelter of American Smelting and Refining Company, at Hayden, Ariz., about a month in advance of previous plans.

reopening of the Mountain City copper mine put 300 men back to work, and at the International copper smelter about 150 men. He also declared that as of November 1, all of the Anaconda's mines at Butte, Mont., had been reopened, and that the company had thereby increased its Butte payrolls from a low of 2,000 men in 1938, to approximately 10,000 at the present time. Mr. Kelley further expressed himself as well satisfied with the outlook for the copper industry.

Illinois Zinc Operations Taken Over by Callahan Company

The Callahan Zinc-Lead Company has taken over for operation under lease the entire zinc mining and milling operations of Illinois Zinc Company. A contract for operating the properties was effected with the Peru Mining Company, wholly owned subsidiary of Illinois Zinc, and covers the Pewaubic and the Grant County mines in the Central district of New Mexico. The properties were taken over as of October 1. Further exploration of the developed property at

the Pewaubic mine, with a vast production of some 500,000 tons of ore, and of the partially developed Grant County mine is planned by the Callahan Company.

Geologists Hold Semi-Centennial Meeting

Fifty years of progress in the science of geology will be celebrated by more than 1,000 geologists from every section of the United States at the semi-centennial meeting of the Geological Society of America, to be held at the Waldorf-Astoria Hotel, New York City, December 28-30, according to an announcement by Dr. Arthur L. Day, of Washington, D. C., president of the Society.

A special anniversary day program on Friday, December 30, will feature geology's contributions to the development of the nation's natural resources. Representatives of the major fields of geology, including mineralogy, economic geology, paleontology, seismology, and petrology, will report advances already achieved, and outline problems yet to be solved.

Coal Division Protests Proposed St. Lawrence Waterway Treaty

Reopening of negotiations with Canada leading toward consummation of a treaty for building a Great Lakes-St. Lawrence River Waterway resulted recently in unanimous adoption of the following resolution by the Coal Division of the American Mining Congress:

Resolution

The Coal Division of the American Mining Congress assembled in Annual Conference at Pittsburgh, Pa., December 2, 1938, declares its opposition to the proposed treaty with Canada for the building of—

A GREAT LAKES-ST. LAWRENCE RIVER WATERWAY

We submit that the proposed treaty, which contemplates a channel 27 feet in depth to the ocean and an immense hydro-electric power development along the St. Lawrence River, is uneconomic and unsound.

We urge the opposition of every coal and mineral producer against this proposal which will greatly increase the present excessive tax load on industry; increase the cost of our basic fuel, which is coal, through increased taxation and freight charges; bring no benefit to our export coal trade and in fact displace our present export trade to Canada; permit importations of coal from the Black Sea ports of Russia and other low-living-standards countries; permit heavy importations of low cost petroleum from Venezuela and Mexico; and through unneeded development of hydro-electric power displace millions of tons of coal production and take work away from thousands of coal miners and railroad workers.

The competition of such a waterway with existing transportation facilities would seriously cripple our railroads, the plight of which is today one of our gravest national problems. The heavy diversion of water to the St. Lawrence River would also seriously harm the facilities of the Mississippi Valley waterways for the carrying of coal and other freight.

We urge that mining men throughout the United States furnish their Senators and Congressmen with a copy of this resolution and point out the harmful consequences of the proposed Great Lakes-St. Lawrence River Waterway Treaty.

British and Canadian Trade Agreements

Completion and formal signing of the reciprocal trade agreements with the United Kingdom and Canada on November 17 brought to an end the

long period of doubt and uncertainty of mineral producers as to how their products would be affected. Fears of many were realized, as evidenced by the following summary showing changes in duties on many minerals and products that will go into effect January 1, 1939:

I. TRADE AGREEMENT WITH CANADA

1. Individual Concessions Made by Canada on Anthracite and Bituminous Coal and on Coke in Schedule 1*

Commodity	1935	Rate of Duty	1938	New Duty
Anthracite coal (ton).....	50c		50c	50c
Coke, n.o.p. (ton).....	\$1.00		\$1.00	\$1.00
Bituminous coal and screenings (ton).....	75c		75c	75c

* NOTE: A provision of the Canadian Treaty removes the 3 percent import tax on anthracite and bituminous coal amounting to from approximately 8 to 20 cents per ton.

2. List of Individual Concessions Made by the United States in Schedule 2.

Commodity	Before New Agreement	Rate of Duty	Under New Equivalent of Agreement New Rate	Ad Val.
Bentonite:				
Unwrought and unmanufactured.....	\$1.50 per ton		75c per ton	
Wrought and manufactured.....	3.25 per ton		\$1.62½ per ton	5%
Crude feldspar.....	35c per ton		25c per ton	4%
Untrimmed phlogopite mica, small pieces.....	15%		10%	10%
Phlogopite mica waste and scrap valued at not more than 5c per lb.....	25%		15%	15%
Mica, ground or pulverized.....	20%		15%	15%
Talc, steatite, or soapstone ground, etc.....	25%		17½%	17½%
Ground feldspar.....	30%		15%	15%
Ground nepheline syenite.....	30%		15%	15%
Boron carbide.....	25%		12½%	12½%
Aluminum, aluminum scrap, and alloys, crude.....	4c per lb.		3c per lb.	20%
Cadmium.....	15c per lb.		7½c per lb.	6%
Zinc-bearing ores, except pyrites containing not more than 3 percent zinc, on zinc content.....	1½c per lb.		1-1/5c per lb.	45%
Zinc in blocks, pigs, or slabs, and zinc dust.....	1-3/4c per lb.		1-2/5c per lb.	27%

3. Articles bound on the free list not previously bound to Canada included lignite and nepheline syenite.

II. TRADE AGREEMENT WITH THE UNITED KINGDOM

1. Concessions on Imports into the United States.

Commodity	Before New Agreement	Rate of Duty	Under New Agreement	Reduction of Duty	Ad Val. Equivalent of New Rate
Magnesium oxide or calcined magnesite.....	7c per lb.		5c per lb.	29%	30%
Litharge.....	2½c per lb.		2¼c per lb.	10%	28%
Red lead.....	2-3/4c per lb.		2¼c per lb.	18%	22%
Lead pigments, n.s.p.f.....	30%		20%	33%	20%
Sodium chloride or salt, in bulk.....	7c per 100 lbs.		4c per 100 lbs.	43%	24%
Kaolin or china clay.....	\$2.50 per long ton		\$1.75 per long ton	30%	18.9%
Fuller's Earth:					
Unwrought and unmanufactured.....	\$1.50 long ton		\$1.00 long ton	33%	7%
Wrought or manufactured.....	\$3.25 long ton		\$2.00 long ton	38%	14%
Fluorspar.....	\$5.60 long ton		\$4.20 long ton	25%	24%
Graphite or Plumbago:					
Crystalline, lump and chip.....	30%		15%	50%	15%
Dust.....	30%		15%	50%	15%
Amorphous.....	10%		5%	50%	5%
Pig iron, containing not more than 4/100 of 1% of phosphorus.....	\$1.125 per ton		75c per ton	33%	n.a.
Chrome metal or chromium metal.....	25%		25%	Bound	25%
Bottle caps of metal, collapsible tubes, and sprinkler tops:					
Not decorated.....	30%		25%	17%	25%
Decorated.....	45%		35%	22%	35%
Lead manufactures, n.s.p.f.....	45%		3c per lb. but not less than 22½% nor more than 45%	n.a.	n.a.

2. Commodities bound on the free list (U. S.) included chrome ore or chromite; sulphur in any form; and crude, unground witherite.

Illinois Coal Operators Association Meets

At the 10th annual meeting of the Illinois Coal Operators Association, held in Chicago November 1, the following were elected as members of the executive board until the next annual meeting, or until their successors are duly elected: D. W. Buchanan, G. B. Harrington, H. E. Howard, T. C. Mullins, M. F. Peltier, T. J. Thomas, and W. P. Young. O. M. Gordon was reelected treasurer for another year.

Immediately following the close of the meeting the executive board met, and organized and reelected M. F. Peltier as chairman. The board also reelected the following officers and general counsel for the ensuing year; M. F. Peltier, president; Fred S. Wilkey, secretary; and Thurlow G. Essington, general counsel.

Labor Board Dismisses Petition

The National Labor Relations Board has announced dismissal of the petition and amended petition filed by the International Union of Mine, Mill and Smelter Workers, Local No. 392 (C. I. O.) seeking investigation and certification of collective bargaining representatives for employees of Utah Copper Company and Kennecott Copper Corporation at their Arthur and Magna mills, Salt Lake County, Utah.

Hearings Concluded on Anthracite Control Measures

Public hearings on the four Lauck Commission bills for state control of the anthracite industry were concluded at Shamokin, Pa., October 21, when the subcommittee of the House Committee on Mines and Mining held its seventh and final open meeting, where they heard local editors, clergymen, public officials and others express approval of the proposed laws.

In earlier meetings anthracite coal operators who appeared before the subcommittee told the lawmakers that the four bills drawn up would, if enacted, inevitably result in further loss of tonnage, increased unemployment in the mining region, and greater burdens on the state. Statements were made at the meeting of the committee on October 11 by W. W. Inglis, president of the Glen Alden Coal Company, who was too ill to appear in person but whose paper was read

Convention Announcement

WHAT? 16th Annual Coal Convention and Exposition of the American Mining Congress.

WHERE? Music Hall, Cincinnati, Ohio.

WHEN? April 24-28, 1939.

Mark these dates on your calendar, and keep them in mind as the days you are going to spend in Cincinnati next year to learn how others are solving their difficult operating problems—to "swap" ideas with mining men from all over the country—and to see a gigantic "mining showcase" full of everything imaginable in up-to-date equipment and supplies.

Plan Now To Be There!

by J. Hayden Oliver, vice president of that company; James H. Pierce, president of the East Bear Ridge Colliery Company; J. B. Warriner, president of the Lehigh Navigation Coal Company; Donald Markle, president of the Jeddo-Highland Coal Company; Ralph E. Taggart, president of the Philadelphia and Reading Coal and Iron Company; and E. C. Weichel, in charge of operations for the Hudson Coal Company.

Anthracite producers presented their final arguments against the measures at a meeting of the subcommittee held in Harrisburg October 18, at which the speakers included L. R. Close, president of the Lehigh Valley Coal Company; Frank W. Earnest, Jr., president of Anthracite Industries, Inc.; and Walter Gordon Merritt, general counsel for the Anthracite Institute.

Missouri Mineral Industries Conference

One of the important outgrowths of the Missouri Mineral Industries Conference, held in Rolla October 21 and 22, was the organization of a committee of 30 representatives of the mineral industries, public utilities, and the railroads of Missouri, for the purpose of bringing about closer cooperation between these industries and the service institutions located on the campus of the state's School of Mines and Metallurgy—these comprising the Missouri School of Mines, the State Geology Survey, and the United States Bureau of Mines. John Prince, presi-

dent of the Stewart Sand and Gravel Company of Kansas City, was appointed chairman of the organization committee, to be assisted by G. C. Smith, assistant to the president of the Missouri-Kansas and Texas Railroad Company in St. Louis, and W. M. Weigel, mineral technologist of the Missouri Pacific Railroad in St. Louis.

Papers of particular interest to the mining industry included discussion of "Technical Problems of the Coal Industry," by T. C. Cheasley, fuel engineer, Sinclair Coal Company; "Technical Problems of the Tri-State Zinc-Lead Mining District," by W. F. Netzeband, Tri-State Zinc and Lead Ore Producers Association; and "Technical Problems of the Lead District," by J. E. Jewell, St. Joseph Lead Company.

About 200 persons attended the conference.

Hecla Resumes Milling At Gem

Operations were resumed early in November at the recently rehabilitated milling plant of the Hecla Mining Company at Gem, Idaho. The 900-ton plant, in which gravity concentration had been utilized previously, was completely modernized and flotation equipment installed. While the plant was undergoing repairs, the Hecla Company sent its ore to the Star mill of the Sullivan Mining Company, of which the Hecla plant is a virtual duplication. James F. McCarthy, Wallace, is president of the Hecla Mining Company.

VALIDITY OF COAL ACT BEFORE COURT

● Price Hearings Under Way in Chicago

Constitutional or unconstitutional? That is the question with respect to the Bituminous Coal Act of 1937 which lies in the hands of the United States District Court for the District of Columbia to determine.

A three-judge court consisting of Chief Justice Wheat and Associate Justice Adkins of the United States District Court for the District of Columbia and Associate Justice Miller of U. S. Court of Appeals for the District of Columbia has received a motion of the National Bituminous Coal Commission to dismiss the bill of complaint for injunction and declaratory judgment filed early in October by the City of Atlanta attacking the constitutionality of the Coal Act.

Extensive arguments were presented on Friday, November 18, with Robert L. Stern, Special Assistant to the Attorney General, appearing for the Government, and J. C. Murphy, Charles S. Rhyne and John McIntyre for the City of Atlanta.

Mr. Stern defended the constitutionality of the Act and presented four grounds upon which the bill should be dismissed. He argued that the City of Atlanta as a consumer had no legal right to sue; that the plaintiff should avail itself of administrative remedies provided; that the suit was premature, and that there should not be any declaratory judgment issued because no justifiable issue is raised and the administrative remedy had not been exhausted.

Attorneys for the City of Atlanta argued that the Act constitutes a burden on essential governmental functions and claimed absolute immunity from the Act for Atlanta. Claim was also made that no provision is made for application for exemption, and, therefore, there is no administrative remedy. Plaintiff's counsel pointed out that the 1935 Act, in its declaration, said the bituminous coal industry is affected with national public interest, and this is omitted from the Act of 1937, inferring that this omission on the part of Congress indicated it no longer felt the bituminous coal industry was affected with a national public interest.

The Court handed down no decision, but allowed the City of Atlanta two weeks in which to file a supplemental brief and the Coal Commission another week in which to reply.

Out in Chicago, on November 14, District Boards in Price Areas Two, Four, and Five began presentation of evidence with respect to prices and classifications proposed by the Boards. The Commission was represented at the hearings by Chairman Tetlow and Commissioners Maloney, Smith, Lewis, and Greenlee. The hearings were expected to last for three or four weeks. The Chicago hearing will conclude a series designated to establish coordinated minimum prices and marketing rules and regulations for bituminous coal produced in the United States.

Price relationships for coals produced in various sections of the United States will be determined by the Commission at the conclusion of the current hearing. After coordination of these prices and prior to their promulgation, a public hearing will be held by the Commission.

The Chicago hearings opened with consideration of Indiana's proposed price schedule. The actual formula used in determining suggested minimum prices for Indiana came in for attack by Howard Vesey, attorney for a group of Indiana and Illinois producers, who charged that the Indiana District Board priced coal on a basis of opinion and not facts. Jonas Waffle, secretary-treasurer of the Indiana Board, related the history of the price-setting schedule, and reported 44 protests had been received on it. Twenty-nine of these were denied, four were satisfied, four were satisfied partially, and the remainder await approval, he said. William M. Zeller corroborated Mr. Waffle's testimony and described the sizes produced in the District and the relationship of these sizes to the proposed prices.

Indiana's case took 3½ days. There were six producers who contended that the district board had failed to price and classify their coals. These included the Sherwood-Templeton Coal Company, Inc., the Central Indiana Coal Company, Inc., Maumee Collieries Company, Patoka Coal Company, Sunlight Coal Company and the Electric Shovel Coal Corporation.

Fifty-nine Illinois coal companies protested against the prices proposed by the board for the Illinois district. George W. Reed, chairman of the Illinois District Board, outlined in detail the formula used by the board in determining suggested prices. He stated

that prices were based on classification of coals following chemical analysis, after which a percentage rule was set up in arriving at the relative value of the coals on a delivered basis.

The Commission also concluded its hearing on proposed prices for Kansas, Missouri, and Texas (District No. 15).

Western Kentucky's price schedule was outlined in detail to the Commission by T. J. Hoffman, a member of the District Board. He emphasized that the suggested prices reflected the classification and value relationships of the various kinds and sizes of coal produced in the district. A proposal to add 10 cents a ton at the mines on all coal subjected to any chemical, oil or waxing process, and 10 to 25 cents a ton on washed coal was submitted by the board.

Grandview Mill Reopened

Reopening of the 350-ton Grandview mill at Metaline Falls, Wash., on November 1 was recently announced by the American Zinc, Lead and Smelting Company. Operations at the mill were suspended last March. Western manager of the operation is D. I. Hayes, Old National Bank Building, Spokane.

Copper Cartel Lifts, Then Reimposes Restrictions

Within the relatively brief space of five weeks, world copper producers comprising the cartel agreed first to lift all restrictions on production, effective October 15, and then on November 24 announced that an agreement had been reached to reduce the outputs so that by January the rate will not be over 110 percent of basic quotas.

The announcement in which the restrictions were lifted indicated that world consumption was so good that, unless world outputs were allowed to expand considerably, there might not be enough of the red metal to go around.

However, developments within the month apparently convinced the operators that consumption would not hold at the level earlier anticipated, and that some such steps would be necessary to maintain a healthy statistical position.

Principal operations affected by the agreement include those in Rhodesia, Belgian Congo and Chile.

Illinois Mining Institute Meets

The 46th annual meeting of the Illinois Mining Institute was held at Springfield, Ill., October 21, at which the following program was presented:

"Problems in Reopening Closed Mines," by Howard Lewis, assistant general superintendent, Old Ben Coal Corp., West Frankfort, Ill.

Modern Methods for Design, Construction and Operation of Coal Preparation Plants: (a) "The Importance of Sampling and Laboratory Tests," by John A. Garcia, Jr.; (b) "Design, Detail and Specifications for a Modern Cleaning Plant," by Wm. vonMeding, Allen and Garcia, Chicago; (c) "Construction and Operation of a Cleaning Plant Considering Minimum Investment, Operating Cost, Minimum Degradation and Maximum Efficiency," by Louis von Perbardt, Allen & Garcia, Chicago, Ill.

"The Stoker Industry: Its Progress, Its Demands and Its Influence on Production, Methods and Policy," by Thomas Marsh, Iron Fireman Co.

"Potential Markets for Illinois Coal on the Upper Mississippi Waterway," by Dr. Walter H. Voskuil, Illinois Geological Survey, Urbana, Ill.

At the meeting Paul Weir, consulting engineer of Chicago, was elected president of the Institute for the coming year, succeeding H. H. Taylor, Jr., vice president of the Franklin County Coal Corporation.

T. C. I. and R. Operations Active

The last of its idle blast furnaces, No. 6 at its Ensley Works, near Birmingham, Ala., was put into operation early in November by the Tennessee Coal, Iron and Railroad Company. This furnace had been idle since February 23, 1938, during which time extensive repairs were made.

Plans have also been announced by the company to increase ingot production by the addition of another open hearth furnace at the Fairfield Works. This will place in production ten of the company's 18 open hearth furnaces—7 at Fairfield and 3 at Ensley—and all of its eight blast furnaces.

The company has also stepped up operations at its big Edgewater mine by adding a night shift, this move having been made November 16. About 400 men will be given work. A double shift is also being used at the Hamilton mine.

Utah Copper Speeds Operations

Operations at the Bingham mines and the mills at Arthur and Magna, Utah, of the Utah Copper Company were speeded up late in October. Some 500 men have been added to the payroll of the company through these expanded operations. Mills at Arthur and Magna are now operating full time, as compared with operations on an alternating basis that had previously been in effect.

In announcing increased production, D. D. Moffat, vice president and general manager of the company, said:

"Due to improved conditions in the copper industry, operations of the Utah Copper Company are being increased somewhat. Additional men required by the increased production have already been recruited."

Output of Douglas Smelter Increased

Operations at the Copper Queen smelter of the Phelps Dodge Corporation at Douglas, Ariz., were recently increased when a fourth furnace was placed in operation, thus bringing the total number of employes at the smelter to about 950.



CHRISTMAS SEALS

help to protect your home and family
from tuberculosis ... BUY and USE
them on your Holiday mail

The National, State and Local Tuberculosis Associations in the United States

Need for Research Stressed at Coal Conference

A well-rounded program on coal preparation, selection, utilization and research featured the Second Annual Coal Conference held at the School of Mines, West Virginia University, Morgantown, November 10 and 11.

Keynoting the aims and purposes of the parley, J. P. Williams, Jr., president of the Koppers Coal Company, made the opening address, in which he stressed the importance of the coal mining industry, traced its down hill trend due to substitute fuels, and asserted that the bituminous coal industry will never be a stabilized, prosperous industry without research.

"Research doesn't necessarily mean chemical research alone," he declared. "There are physical, mechanical and economical researches into the cheaper mining of coal, the preparation of same, and then that most important subject of distribution and consumption of the product. Practically every subject on your program here has some relation to research." He concluded by making a strong plea that the State of West Virginia, with a greater stake in bituminous coal research than any single corporation or group of corporations, appropriate a substantial sum to initiate a research program at the university.

An interesting tabulation showing numbers of papers on the subject of coal research published in some 22 different countries throughout the world during the past 10 years, as revealed in *Chemical Abstracts*, was presented by Dr. H. H. Lowry, director, coal research laboratory of Carnegie Institute of Technology, in a paper entitled "Recent Developments in Coal Research." These tabulations showed that the productivity of scientific work on coal remained stationary over the past 10 years, while all scientific work has increased over 50 percent, thus justifying his conclusions that scientific interest in coal and its utilization is decreasing relative to that in other subjects.

In presenting a paper entitled "Coal Preparation," R. E. Salvati, vice president of the Island Creek Coal Company, stressed the fact that coal preparation is directly related to coal combustion, and that the efficiency of the combustion of many coals is dependent in a large measure upon the efficiency of cleaning. He outlined important features at the company's No. 1 plant, termed by him "the latest, and in many respects, the most complete of five preparation plants built

by Island Creek at our mines at Holden, W. Va." Built by Roberts and Schaefer Company, the plant's outstanding features comprise: surplus washing capacity, cleanliness (resulting from dust collection facilities), binning and blending equipment, and crushing and rescreening of crushed coal. "After building four preparation plants," Mr. Salvati stated, "we were able to capitalize on our experience and include the good features of the different plants in this last construction; likewise, we were able to eliminate any objectionable features encountered in our previous construction."

The subject, "Influence of Transportation on the Future of the Coal Industry" was outlined by S. C. Higgins, secretary and traffic manager of the New River Coal Operators Association. After outlining the present serious plight of the railroad industry due to losses in revenue, he showed how the following factors had contributed to this condition: losses to trucks; losses to substitute fuels; increased efficiency in the use of bituminous coal; shorter working hours; legislative trends; and freight rates. In concluding, he declared: "Obviously, there is a need for increasing carriers revenue, but it seems to the coal industry that reductions in freight rates on coal rather than the present trend toward increasing such rates, would be a more proper exercise of managerial discretion, thus permitting the coal industry to restore to the carriers a substantial loss in revenue which they have suffered, more especially by the freight rate barrier. To accomplish this end, we believe that reductions in expenditures of the carriers can be accomplished by: (a) modernization of plants, (b) consolidations, (c) the abandoning of duplicate and unnecessary facilities, (d) reduction in the cost of materials, supplies and labor, and (e) collective responsibility of management."

A banquet on Friday night brought the two-day program to a close, with Toastmaster W. E. E. Koepler, secretary of the Pocahontas Operators Association, stressing to conference members that the principal objective of the yearly meeting is to educate the consuming states on the value and new uses of coal.

Charles E. Lawall, acting president of West Virginia University, gave a brief address at the banquet, in which he outlined the great need for research in the coal industry in West Virginia, and declared that the proposed \$770,000 building to be built

on the university campus as a part of the School of Mines will be a great aid in such a coal research program.

Committee chairmen in charge of various functions included W. E. E. Koepler, chairman of the program committee; M. W. Horgan, chairman of the reception committee; and Charles Dorrance, chairman of the entertainment committee.

Koppers Expands West Virginia Operations

Operations at the newest development of the Koppers Coal Company, the model coal community at Koppers-ton, Wyoming County, W. Va., were started November 14, according to a statement by P. C. Thomas, vice president of the Koppers Coal Company. Asserting that the company does not expect to be in full operation for about a year at this property, Mr. Thomas pointed out that a crew of some 80 miners living in the vicinity has already moved into the model community, which has been under construction by the company for more than a year.

In another statement it was announced by J. P. Williams, Jr., president of the Koppers Coal Company, that two West Virginia mines of the company which have been closed since early this year due to decreased demand, were reopened November 1, providing employment for about 625 additional miners.

Federal mine No. 3, near Everettville, in the Fairmont district, closed since last February, will employ about 125 miners, and the Carswell mine, near Kimball, in the Pocahontas field, which has been shut down since early last March, will employ about 400 miners. The ventilating system at the latter mine was improved while it was closed.

Both of these mines supply industrial and utility markets, the Carswell mine also producing washed coal for domestic as well as industrial use.

Classes of the Mining Extension Department of West Virginia University are off to a flying start this fall, with 1,477 men enrolled in the courses. Leading districts in the enrollment include Welch, with 225; Beckley, with 204; and Logan, with 191.

Wheels of Government

(Continued from page 45)

Repeatedly statements are made that it is not the purpose of the Committee to investigate individual industries or individual companies, but that the investigation is to be one of business practices and procedure on a broad basis. Among the many things to which the Committee is assigning members of its staff for examination are the activities of exporters under the Webb-Pomerene Act, which has been an aid in the sale of domestic commodities in foreign lands.

Social Security

In the last session of Congress the chairmen of both the Senate Finance Committee and the House Committee on Ways and Means had in their possession for several months suggested amendments to the Social Security Act which had been prepared by the Social Security Board and approved by the Administration. Because the Act was in the development stage and, further, the Social Security Advisory Council still had the matter of amendments under consideration, it was announced last April that the Committees would take no action in that session of the Congress.

It is now known that the Social Security amendments are to be the first order of business before the Committee on Ways and Means after the organization of the House of Representatives is completed in January. It now appears that the Advisory Council is prepared to recommend that the Federal Government contribute one-third of the cost of the old age insurance plan. At the present time employers and employees contribute equal amounts; the reason for arranging for additional funds arises from the plan for an enlarged program to include agricultural, seafaring and other workers. Also involved is the matter of increasing the amount of the insurance benefits, as well as starting the payments to beneficiaries at an earlier date.

It is not anticipated that action will be taken to change the pay roll tax rates or to reduce the size of the contemplated old age pension "reserve fund" in the 1939 session. Final recommendations are planned by the Advisory Council in 1942 after the Board can make figures available on three years' operation of the Act.

There is an interesting side-light on the functioning of the field staff of

the Social Security Board. Hurriedly employed in the effort to put the law into operation as soon as possible after enactment, there has been much lost motion in the effort to make a smoothly functioning machine out of the many thousands who compose the personnel under the Board. In an effort to reduce costs and increase efficiency in the operation of its regional office areas, the Board is now sending out carefully selected men, who have been schooled in efficiency and personnel work, from the regional offices to reduce personnel and improve operation. This is a natural development in so large an organization which was forced to perform its initial function under emergency conditions.

The Place of Mining

(Continued from page 14)

been charted accurately enough to enable us to perceive the objectives toward which we are heading. Neither in condemnation nor in commendation will the answer be found, but in the inexorable laws that ultimately control human action and endeavor.

Cooperative and Constructive Efforts Needed

Notwithstanding the clouds that hang heavily on the horizon, it cannot be accepted that they portend defeat. It must be recognized that they are problems that must be solved if our economic system is to survive and our form of government be preserved. These problems, dealing largely with human relations and conditions, challenge us to cooperative and constructive effort. Current events have demonstrated the rapidity with which national ideologies and aspirations may change, and institutions thought to be safely anchored by respect and tradition swept away. I know I speak the unqualified sentiment of our industry and of this assemblage when I offer the pledge that we stand squarely for the support of our Government, its traditions and its constitutional institutions.

We do not believe that the destiny of this great republic has been fulfilled. We do not believe that its institutions have resulted in failure, or that the constitutional limitations upon the powers of government or its constituted agencies should be ignored or brushed aside. On the con-

trary, let us reaffirm our faith in its perpetuity and our unwavering conviction that as it has been in the past—so it shall continue in the future, a land where peace and prosperity shall be established within, and that to the world its precepts and example may be a benign influence to lead the nations to the way of peace, tolerance and freedom of thought, action and belief now so flagrantly challenged.

Canadian Treaty

(Continued from page 42)

the mines to a five day week. This law has become very unpopular among our workmen, who would much prefer the extra earnings of a six day work week to an additional day of idleness.

Translated in terms of employment, the loss of one-third of our zinc concentrate market means that 4,000 men in the tri-state mining district and smelters handling its concentrates will lose their jobs.

It has long been customary in the tri-state mining industry to share the benefits of increased concentrate prices with the workmen by advancing their pay as ore prices advance. Conversely, the workmen expect pay reductions when prices fall, because they know that this is the only means the operators have of avoiding shut-downs and lay-offs. Before the tariff announcement we were on a rising market with concentrates at \$34 and wages due to advance at \$35. The cut forestalls any possibility of a wage increase. In fact, many operators will have to cut wages below the normal scale if they are going to run at all. Small wonder that our workmen are rapidly coming to the thought that they might survive if the Government would simply let them alone.

Considering the genuine merit of our case against a tariff reduction, we know that this calamity could never have occurred had Congress retained its constitutional privilege of fixing tariffs and the Senate its right to ratify treaties.

Federated Metals Division of the American Smelting and Refining Company, Chicago, Ill., has announced the removal of its offices and plant to 123rd Street and Indianapolis Boulevard, Whiting, Ind.

BOOK REVIEWS

AN INTRODUCTION TO METALLURGY, by Joseph Newton. John Wiley & Sons, New York City, 1938. 537 pages. \$4.

ALTHOUGH there are several books with a more or less similar title it should not be said that this is just another of those. The contents are largely a development of lecture notes used by the author in a class in the principles of metallurgy at the University of Idaho. Approximately a third of the work is devoted to adaptive metallurgy, and the remainder to extractive metallurgy. Each chapter is followed by exercises for students or other readers, together with literature references. The index is ample.

Under "adaptive metallurgy" one finds the complexities of the structure of metals including crystal grains and grain boundaries and growth; the structure of such alloys as lead-antimony, gold-platinum, lead-bismuth, and calcium-magnesium, also a discussion of the Gibbs' phase rule, the physical properties of metals and alloys and their testing, also electrical conductivity, malleability, and corrosion; the shaping of metals and alloys; the heat-treatment of metals and alloys; and descriptions of the common industrial metals and their alloys.

Under "extractive metallurgy" are covered the sources of metals and a 55-page chapter on the dressing of their ores—comminution, including explosive or steam shattering, sizing, and concentration. The statement that jigs are no longer of great importance in milling operations is a slip, when one considers their growing use on dredges and in the milling of gold-silver, fluorspar, and zinc-lead ores. Electrolysis principles and the refining of metals thereby are given a separate chapter.

In the reviewer's opinion, the next to last chapter (which is historical and statistical) on sampling and custom-plant procedure with ores and concentrates concludes a good book of clear typography and few errors in spelling.—M. W. von Bernwitz.

THE WORLD COAL-MINING INDUSTRY, *International Labour Office: Studies and Reports, Series B (Economic Conditions), No. 31* Geneva, 1938. Two volumes. Price (per volume), 8s., or \$2.

THE "key" position of coal in the economy of the world and the difficulties which the industry has had to

face in recent years have directed general attention to the complex economic and social problems involved.

The International Labour Office is now publishing a work in two volumes—"The World Coal-Mining Industry"—which provides exhaustive information upon these problems.

In its original form this work was prepared and distributed in proof as a report intended to serve as a basis of discussion for the Technical Tripartite Conference on the Coal-Mining Industry which was held in Geneva in May, 1938.

Volume I deals with economic conditions. It includes a historical survey of the "coal problem," discusses the place of coal in the industrial economy and surveys in detail world production and consumption, the world trade in coal, and the movement towards integration and regulation.

Volume II covers the social aspects of the industry and deals with labor supply, wages and earnings, employment and unemployment, social insurance, weekly rest, public holidays, annual holidays with pay, and hours of work.

Statistical information is also given on the number of persons employed, employment and unemployment, and wages and hours of work.

The two parts thus make a comprehensive and valuable reference work of information which is available elsewhere, if at all, only in various languages in a large number of scattered publications.

TRADE ASSOCIATIONS IN LAW AND BUSINESS, by Benjamin S. Kirsh, in collaboration with Harold R. Shapiro. Central Book Company, New York City, 1938; 399 pages; \$5.

IN VIEW of the nation-wide interest in the monopoly inquiry, and the importance of this investigation to the business and legal world, this volume is of particular timeliness. It is an exhaustive survey and evaluation of the business, economic, and legal aspects of trade associations in modern industrial society, discussing such constructive trade association services as statistical reporting plans, uniform cost accounting methods, trade relations, patent interchange, foreign trade, credit bureau and collective purchasing functions, standardization and uniform basing point systems. It is a practical, yet scholarly, analysis of the problems of such associations under the anti-trust laws.

Publications of Interest

U. S. Bureau of Mines

Bull. 413. MINERAL INDUSTRIES SURVEY OF THE UNITED STATES, CALIFORNIA, CALAVERAS COUNTY, MOTHER LODE DISTRICT (SOUTH), MINES OF THE SOUTHERN MOTHER LODE REGION, PART I—CALAVERAS COUNTY, by C. E. Juhlin and F. W. Horton. 140 pp. 34 figs. 30 cents.

T. P. 589. COST OF COAL-MINE FATALITIES AND SOME PERMANENT DISABILITIES IN OHIO, January 1, 1930, to December 31, 1934, by C. W. Owings. 31 pp. 10 cents.

I. C. 7035. LIGHTING PRACTICES IN COAL MINES OF THE UNITED STATES, by A. B. Hooker and C. W. Owings. 11 pp.

I. C. 7036. NECESSITY FOR MORE EXTENDED USE OF SAFETY EQUIPMENT IN MINING, by D. Harrington. 14 pp.

I. C. 7037. SOME INSTRUMENTS AND DEVICES THAT COAL-MINE OFFICIALS SHOULD UNDERSTAND AND USE, by G. W. Grove. 11 pp.

U. S. Geological Survey

Bull. 885. GEOLOGY AND ORE DEPOSITS OF THE LORDSBURG MINING DISTRICT, N. MEX., by Samuel G. Lasky. 62 pp. 25 plates. 9 figs. \$1.25.

Bull. 891. GEOLOGY AND MINERAL RESOURCES OF THE HONEYBROOK AND PHOENIXVILLE QUADRANGLES, PA., by F. Bascom and G. W. Stose. 145 pp. 11 plates. 20 figs. 65 cents.

P. P. 189-B. IGNEOUS GEOLOGY AND STRUCTURE OF THE MOUNT TAYLOR VOLCANIC FIELD, N. MEX., by Charles B. Hunt. 80 pp. 13 plates. 13 figs. 45 cents.

U. S. Department of Labor

Bull. 21, Parts I, II, III and IV. NATIONAL SILICOSIS CONFERENCE. Reports on Medical Control; Engineering Control; Economic, Legal and Insurance Phases; and Regulatory and Administrative Phases, Part I—112 pp. 15 cents. Part II—62 pp. 15 cents. Part III—86 pp. 15 cents. Part IV—64 pp. 15 cents.

Miscellaneous

Arizona Bureau of Mines, Geological Series No. 12, **Bull. 145. SOME ARIZONA ORE DEPOSITS**, by various authors. 136 pp. 40 plates. 12 figs. 35 cents. (Free to residents of Arizona.)

POTENTIAL MARKETS FOR ILLINOIS COAL ON THE UPPER MISSISSIPPI WATERWAY, by Walter H. Voskuil. Illinois State Geological Survey, Circular 41. 19 pages. 2 figs.

Department of Scientific and Industrial Research, Fuel Research, **T. P. 47 (Great Britain). THE PRODUCTION OF ACTIVE CARBON FROM BITUMINOUS COAL**, by J. G. King, D. MacDougall and H. Gilmour. 55 pages. 5 figs. 3 plates. 40 cents.

PROCEEDINGS OF THE ROCKY MOUNTAIN COAL MINING INSTITUTE (1938). H. C. Marchant, president. 84 pp.

REPORT OF THE COMMITTEE ON PRICES IN THE BITUMINOUS COAL INDUSTRY. Prepared for the Conference on Price Research. National Bureau of Economic Research (1938), with appended index. 144 pp. 3 figs. \$1.25.

PERSONALS



J. F. CALLBREATH, secretary-emeritus of the American Mining Congress, was given a party December 2 by a number of Washington friends in celebration of his 80th birthday. It



was a real gratification to see Mr. Callbreath return from his summer's vacation in Colorado just as hale and hearty as ever.

R. C. ALLEN, executive vice president of Oglebay, Norton & Company, Cleveland, has been elected a member of the board of trustees of Battelle Memorial Institute, industrial research organization of Columbus, Ohio, according to an announcement by EARLE C. DERBY, newly elected president of the board.

LOUIS S. CATES, president of Phelps Dodge Corporation, has been elected William Lawrence Saunders Gold Medallist by the board of directors of the American Institute of Mining and Metallurgical Engineers.

In achieving this honor, Mr. Cates joins the ranks of such illustrious engineers as the late John Hays Hammond, Herbert Hoover, Daniel C. Jackling, Walter H. Aldridge, Clinton H. Crane, and Pope Yeatman, who are among those that have received this distinguished award.

J. REX ST. CLAIR has been appointed manager of the Wilmington office of the explosives department of Hercules Powder Company, succeeding J. J. KELLEHER, who resigned November 11. Mr. St. Clair has been affiliated with the explosives industry since 1918, during which he has served both the Etna Powder Company and the Hercules Powder Company. He will make his headquarters in Wilmington.

DONALD B. GILLIES, vice president of the Republic Steel Corporation of Cleveland, Ohio, has been elected president of the American Institute of Mining and Metallurgical Engineers for the year 1939.

Four new directors chosen for 1939 were Charles Camsel, deputy minister of the Department of Mines and Resources of the Dominion of Canada; Chester A. Fulton, president of the Southern Phosphate Corporation; James T. MacKenzie, metallurgist and chief chemist of the American Cast Iron Pipe Company; and Francis A. Thomson, president of the Montana School of Mines.



J. B. MORROW, previously preparation manager, Pittsburgh Coal Co., has been promoted to the position of production vice president.

J. W. STRICKLER has been appointed general manager of the Vera Pochontas Coal Company's Empire mine at Landgraft, W. Va.

L. KENNETH WILSON is now manager of the Auburn Chicago Mining Company, Auburn, Calif., following a two-year period spent as assistant geologist for the Eastern Exploration Company at Goldfield, Nev. Wilson's new appointment fills the vacancy caused by the recent death of J. N. McLELLAN.

J. L. KOYSTAL has been appointed superintendent of the Keystone mine, the Koppers Coal Company, at Keystone, W. Va.

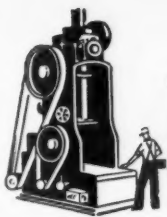
—Obituaries—

VAN DYNE HOWBERT, prominent mining engineer, died in New York City October 13, at the age of 46. He held degrees from Yale University and the Colorado School of Mines, and had been associated for several years as a mining engineer with the American Metal Company of New York.

MURRAY SCHICK, well known writer and authority on western financial and mining affairs, died in his office in Salt Lake City on November 15 when struck by a bullet accidentally discharged from a gun he was cleaning. His age was 64.

Mr. Schick had been identified for many years throughout the West for his prominent work in editing financial and mining news for many of the larger newspapers. In 1933 he entered private business, and until his death was secretary-treasurer of the Alta Tunnel and Transportation Company.

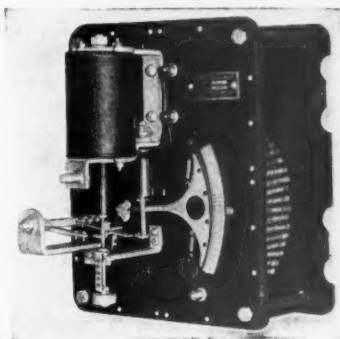
THOMAS STOCKDALE, oldest member of the West Virginia Department of Mines, died at his home at Bramwell, W. Va., on October 19, at the age of 66. In his 21 years of service "Tommy," as he was affectionately known to his many friends, played an invaluable part in promoting safety in mines. He joined the inspection staff of the Department of Mines in 1917, and the mining fraternity owes him a debt of gratitude for his long and loyal service.



MANUFACTURERS' Forum

Rocking Contact Voltage Regulator

Allis - Chalmers Manufacturing Company's Switchgear Division, Milwaukee, Wis., has come out with a new simple, inexpensive "Rocking Contact" type voltage regulator, known as their Type V-O, designed for automatic voltage control of small alternating and direct current generators. This proven design of regulator was heretofore available only in the larger, more expensive rocking-contact - principle regulators. This same principle being incorporated in the new V-O regulator, it is very



quick acting, regulating the voltage by directly varying the resistance in the field circuit.

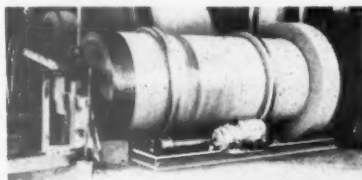
There are no vibrating contacts, tubes, or other parts requiring replacement or readjustment at frequent intervals. An attractive metal enclosing case excludes dust and other foreign matter, thereby reducing maintenance. Only two simple adjustments to be made at the time of installation, since all major adjustments are made at the factory.

The regulator is of small dimensions and suitable for either switchboard or wall mounting. Descriptive Leaflet No. 2326 may be obtained from the Switchgear Division.

Hardinge Counter Current Classifier

Recent new improvements in the Hardinge Counter Current Classifier present very definite advantages.

Capacity has been increased for a given size of classifier volume, by changing the shape of the spiral attached to the drum, with which it rotates, the spiral rolling the sands from the feed end to the oversize or



discharge portion. Decreasing the height of the spiral in the settling zone and increasing it at the oversize end, greatly reduces agitation and permits handling of greater quantities of oversize. Thus increased capacity of both finished product discharged and oversize or sands delivered at the opposite end, is obtained.

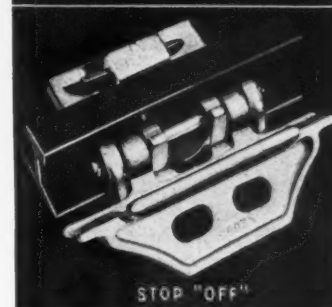
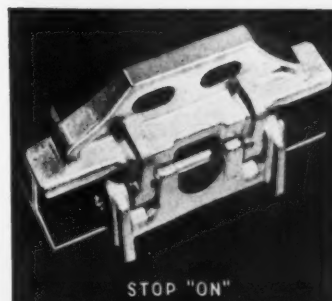
A change in the discharge arrangement that delivers the sands from the oversize end, has raised the point of discharge nearly a third more than was previously obtained. Consequently, when operating in closed circuit with a ball mill, a scoop feeder of ordinary diameter can be used instead of extra-size scoops formerly required when large circulating loads and high capacities were put through the system.

Mine Car Stop

Continuing its development of safety equipment for the mining industry, the Portable Lamp & Equipment Company, Pittsburgh, Pa., has introduced a new malleable iron car stop for use in reducing mine haulage accidents.

In design, the car stop consists of five individual malleable castings and a 9/16-in. diameter rolled steel hinge pin, assembled as a complete unit. The height of the stop above the rail is 3 in., and the length is extended under the tread to stop about 1½ in. short of the wheel center. Hinged to the base, the stop can be thrown off the rail when not in use. The base is secured to the bottom flange

of the rail by gripping the flange itself between the base member and a special malleable iron clamp plate. The force to accomplish this is produced by driving a malleable iron wedge between the clamp and through a special housing cast integral with the base member. Lugs on both the base and stop members overlap and prevent the stop member from being thrown off the rail, or out of posi-



tion, as a result of severe service or accidental causes, and this positive locking feature is felt to be of great importance.

The new malleable iron car stop received its first field tests at the Wildwood Mine of the Butler Consolidated Coal Co., where it performed successfully under severe conditions.

General Electric's 60th Birthday

General Electric's sixtieth year was fittingly observed October 17 in Schenectady, when the Chamber of Commerce presented the company with

a bronze plaque, commemorating the steps leading to the formation of the company and its location in Schenectady. The plaque was presented by Laurence G. Wagner, president of the Chamber of Commerce. It was accepted for the company by Gerard Swope, president. A large group of employees, Chamber of Commerce officers, officials of the General Electric Company, and others witnessed the brief ceremony. Also during the evening, at a dinner given by the Chamber of Commerce, three veteran employees of the company with 50 or more years of active service were presented engrossed certificates and diamond-studded pins by the company. The veteran employees were Charles J. Leephart, of Schenectady, with 55 years; Roderick S. McNeil, of Bridgeport, with 51 years; and George S. Jameson, of Lynn, with 50 years.

Bower Enters Bearing Field Through Ahlberg

A new entry into the industrial roller bearing field has just been announced with the appointment of Ahlberg Bearing Company as nationwide distributor for the products of Bower Roller Bearing Company of Detroit. While the Bower Company have been one of the largest manufacturers of roller bearings for almost a quarter of a century their sales in the past have been almost entirely confined to the automotive industry where they have been widely known as manufacturers of roller type bearings for many of the leading motor car manufacturers.

Distribution of the Bower line is to be made in the industrial field through the Ahlberg Bearing Company which will continue to be a source of supply for RBC roller bearings, Norma-Hoffman ball bearings, CJB Master ball bearings and Ahlberg Ground Bearings.

The 34 branch warehouses of Ahlberg and their associates, Precision Bearings, Inc., of Los Angeles, will handle the nation-wide distribution of the full line.



Porcelain-tube type resistance for mine locomotive headlights recently announced by Ohio Brass Co., Mansfield, Ohio. Resistances cover line voltages of from 220 to 675 volts, with perforated steel case serving as protection

Brazil Washing Plant To McNally-Pittsburg

The McNally-Pittsburgh Manufacturing Company has received an order from the Consorcio Administrador de Empresas de Mineracao, for a large coal washing plant to be built in Brazil. This order will require almost 20 carloads of machinery to be built in and shipped from the company's plant in Pittsburg, Kans.

Brown Named Hercules Manager

Hercules Powder Company announces the appointment of Tom Brown as manager of the contractors'

division of the explosives department, succeeding J. J. Kelleher, who resigned November 11. Mr. Brown, connected with the explosives industry since 1911, is widely known to the contractors of this country.

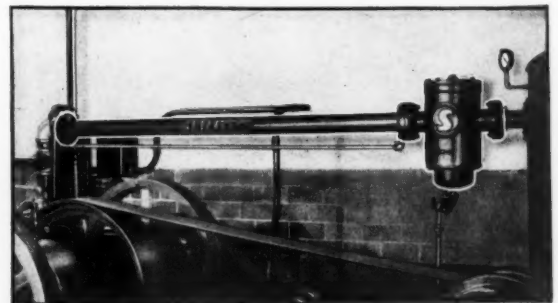
Tom Brown became affiliated with Hercules Powder Company in 1929. After a year of sales work in Birmingham, Ala., district, he went to Chicago where for the past eight years he has served as a representative of the contractors' division. Promotion to manager of the division follows a successful record of sales activities which have given him an intimate knowledge of contractors' requirements.

Mr. Brown will make his headquarters in Wilmington.

Air and Gas Aftercoolers

The Sullivan Machinery Company, Michigan City, Ind., has prepared a two-color bulletin descriptive of their Series "P" Compressed Air and Gas Aftercoolers.

These aftercoolers are available in six sizes for capacities from 125 to 755 C.F.M. They are easily installed as an integral part of the pipe line.



A feature of the Series "P" aftercoolers is a built-in moisture and oil separator which is unusually efficient. Ask for Bulletin A-21.

O. C. Hoffman, Pres. Established 1902. L. H. Hoffman, Treas.

HOFFMAN BROS. DRILLING CO.

—CONTRACTORS—

DIAMOND CORE DRILLING

PUNXSUTAWNEY, PA.

Our specialty—Testing bituminous coal lands
Satisfactory cores guaranteed



We Look Into the Earth

By using Diamond Core Drills. We prospect Coal and Mineral Lands in any part of North or South America.

Pennsylvania Drilling Co.
Pittsburgh, Pa.
Drilling Contractors

du Pont Plans Golden Gate Exhibit

Plans for an extensive exhibit at the San Francisco Golden Gate Exposition were recently announced by E. I. du Pont de Nemours & Company, of Wilmington, Del.

The company has leased approximately 6,500 square feet in the Homes and Gardens Building, and will erect a completely self-contained structure of its own within the walls of the building. It will house a series of dramatized presentations showing the social contributions of chemistry. Purpose of the display, officials indicated, is an interpretation of the achievements of America's diversified chemical industry to the West Coast area.

Ohio Brass Extends Kingsbury's Field

The Ohio Brass Company, Mansfield, Ohio, announces that effective immediately Mr. Claude R. Kingsbury, with headquarters in Seattle, Wash., will take over the territory formerly handled by Mr. J. W. Watkins, who is leaving the employ of the company. Mr. Kingsbury has been with the company since 1927—first at the Barberton insulator plant, where he was in charge of the electrical laboratory, and more recently associated with the Mansfield plant on street railway and trolley coach engineering.

CATALOGS AND BULLETINS

- **ALLOY STEEL.** *American Manganese Steel Division of the American Brake Shoe and Foundry Co.*, Chicago Heights, Ill. Bulletin presents research facilities that have made AMSCO-ALLOY possible, the properties of this alloy and its wide range of usefulness. 24 pages.
- **AMALGAMATING EQUIPMENT.** *Mill and Mine Supply, Inc.*, 2700 Fourth Ave., South, Seattle, Wash. Folder presents specifications and operating features of company's new Titan Rotary Amalgamator. 4 pages.
- **CAR DUMPING DEVICES.** *The Mining Safety Device Co.*, Bowerston, Ohio. Bulletin describes company's line of rotary and gravity mine car dumping devices. 6 pages.
- **COAL LOADERS.** *Joy Manufacturing Co.*, Franklin, Pa. Folder illustrates Joy's 11-BU loading machine operating in an Illinois mine.
- **CONDENSER TUBE WASHER.** *Worthington Pump and Machinery Corp.*, Harrison, N. J. Form W-200-B4 describes the new Worthington hydraulic tube washer for surface condensers. 4 pages.

• **DIESEL-DRIVEN COMPRESSOR.** *Ingersoll-Rand Co.*, Phillipsburg, N. J. Form 3072 describes the new heavy-duty diesel-engine-driven compressor, known as the "XVO," which has just been announced by the Ingersoll-Rand Company. The "XVO" is entirely new in design and combines a horizontal heavy-duty double-acting compressor with a heavy-duty "V" type 4-cycle diesel engine in a single, compact and comparatively light weight unit, which operates at a moderate speed. 16 pages.

• **DIESEL ENGINES.** *Ingersoll-Rand Co.*, Phillipsburg, N. J. Catalog 10110 presents the company's new heavy-duty continuous service, compact engine for stationary or marine-electric application. Type "S" engine is built in sizes of 3, 4, 5, 6, 7, and 8 cylinders, and is rated at 175, 230, 290, 350, 405, and 460 B.H.P., respectively, for 600 revolutions per minute. 40 pages.

• **DRILL ROD MACHINE.** *The Toledo Pipe Threading Machine Co.*, Toledo, Ohio. Folder describes the uses and operation of the new "Toledo" Rock Drill Rod Power Machine for turning, necking, facing, chamfering and threading drill rods for detachable bits.

• **DRILLING EQUIPMENT.** *Sullivan Machinery Co.*, Claremont, N. H. Bulletin SS10 presents specifications and operating features of the new Sullivan "Safe-T-Stoper." 12 pages.

• **DUST SAMPLING INSTRUMENTS.** *Mine Safety Appliances Co.*, Pittsburgh, Pa. Bulletin CT-1 features the M.S.A. midjet impinger as the latest development in dust sampling apparatus employing the accurate impinger method. It is small, light (weighs less than 10 lbs.), compact, and provides convenient portability with easy hand operation. 1 page.

Bulletin CT-2 details the M.S.A. electrostatic dust and fume sampler, designed for quantitative sampling, and employing the principle of pre-ionization with electrostatic precipitation. The unit is compact, easy to use in sampling from the general atmosphere or from stacks or ducts, and is said to be the only efficient sampler for metal fumes. 1 page.

• **ELECTRICAL EQUIPMENT.** *Ideal Commutator Dresser Co.*, Sycamore, Ill. Form BR 938 presents complete line of company's auxiliary electrical and other miscellaneous equipment. 16 pages.

• **FIRE FIGHTING EQUIPMENT.** *Cardox Corporation*, 307 N. Michigan Ave., Chicago, Ill. Folder announces new modern fire fighting equipment offered by the company. The Cardox Corporation now makes carbon dioxide available for the first time in unlimited quantities and at reasonable prices. A new method of storing and transporting carbon dioxide in liquid form at a very low temperature and in unlimited bulk quantities has been developed. The scope of carbon dioxide for fire fighting has thus been expanded tremendously by this development. 4 pages.

• **GAS TESTING EQUIPMENT.** *Mine Safety Appliances Co.*, Pittsburgh, Pa. Bulletin DN-3 details the new MSA Methane Tester, an instrument for quickly and easily determining methane in mine air. 2 pages.

Bulletin DN-3 describes the new M.S.A. Benzol Indicator. 1 page.

Bulletin DZ-1 presents the applications and principle of operation of the M.S.A. Hydrocyanic Acid Gas Detector. 1 page.

• **MAGNETIC CLUTCHES.** *Stearns Magnetic Mfg. Co.*, Milwaukee, Wis. Bulletin 225 describes the company's recently perfected multiple disc magnetic clutch, style "ED." This magnetic clutch utilizes the duplex principle, and is designed to operate two clutches, both magnetically energized with a single magnet. By this duplex arrangement the unit can be operated in either direction simultaneously. 16 pages.

• **MATERIALS HANDLING EQUIPMENT.** *Bucyrus-Erie Co.*, South Milwaukee, Wis. Folder summarizes the uses and operation of the company's 18-B, 20-B, and 22-B draglines, cranes or clamshells.

• **MECHANICAL LOADERS.** *Sullivan Machinery Co.*, Claremont, N. H. Bulletin 76-L describes the new Sullivan mine car loader for loading in narrow headings. An insert entitled "Sullivan Load-O-Graph" presents diagrammatically the use of the company's complete line of scraping and loading equipment for metal mines in moving material from various types of workings to different kinds of ore or waste receptacles. 4 pages.

• **PIPE REPAIR EQUIPMENT.** *M. B. Skinner Co.*, South Bend, Ind. Catalog No. 38A describes company's complete line of pipe repair clamps and saddles, and valve and bibb reseaters, with prices. 32 pages.

• **PUMPS.** *Worthington Pump and Machinery Corp.*, Harrison, N. J. Catalog W-423-B5 presents specifications of the company's vertical triplex, single-acting power pumps. 4 pages.

• **STORAGE BATTERIES.** *The Electric Storage Battery Co.*, Philadelphia, Pa. Form 4000 entitled "Fifty Years of Achievement" commemorates the company's golden anniversary, outlining a brief history of the company, and presenting by means of very effective illustrations the indispensable role played by storage batteries in modern civilization. 40 pages.

• **TRACTORS.** *Caterpillar Tractor Co.*, Peoria, Ill. Form 4870 sets forth the economies, advantages and capacities of the "Caterpillar" diesel D4 tractor, with many cut-away photographs showing the principles of the tractor's diesel engine, its fuel system, operation, etc. 32 pages.

• **VIBRATING SCREENS.** *Allis-Chalmers Mfg. Co.*, Milwaukee, Wis. Bulletin 1474-B presents Allis-Chalmers new "Aero-Vibe" inclined type of screens which utilize a mechanism of the off-center weight type to produce vibrating motion. Illustrations include both single and double deck types. 8 pages.

PIERCE MANAGEMENT

Engineering Consultants and Mine Managers
Anthracite—COAL—Bituminous

A successful background in the practical solution of difficult engineering and management problems.

Scranton Electric Building
Scranton, Pennsylvania

PETER F. LOFTUS

Consulting Engineers

ENGINEERING AND ECONOMIC SURVEYS, ANALYSES AND REPORTS ON POWER APPLICATIONS AND POWER COST PROBLEMS OF THE COAL MINING INDUSTRY

Oliver Building Pittsburgh, Pa.

SECTIONALIZE with



AUTOMATIC RECLOSING CIRCUIT BREAKERS

Raise production; reduce fire hazard; lower maintenance charges; decrease total energy consumption and power demand. These advantages with Automatic Reclosing Circuit Breakers are fully described in I-T-E bulletins based on actual installations in mines.

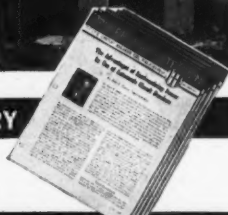
At right—Each circuit breaker controls a section, confining disturbances to the area in which they arise.

Representatives in
Principal Mining Areas



BULLETINS TELL THE STORY

These bulletins deal with a variety of mining conditions. Copies will be gladly furnished on request.



I-T-E CIRCUIT BREAKER CO.
PHILADELPHIA, PA.

INDEX TO ADVERTISERS

	Page
American Chain & Cable Co., Inc.	Third Cover
Hazard Wire Rope Division	
Goodman Mfg. Co.	Second Cover
Hoffman Brothers Drilling Co.	56
I-T-E Circuit Breaker Co.	58
Jeffrey Mfg. Co.	9
Joy Mfg. Co.	6
Link-Belt Co.	5
Loftus, Peter F.	57
Mine Safety Appliances Co.	Back Cover
Ohio Brass Co.	3
Pennsylvania Drilling Co.	56
Pierce Management	57
Pure Oil Co.	58
Robinson Ventilating Co.	58
Roeblings Sons Co., John A.	7
Sullivan Machinery Co.	4
Universal Vibrating Screen Co.	58

THE PURE

PURE THREE POINT LUBRICATION



A COMPLETE LINE
OF INDUSTRIAL
PETROLEUM PRODUCTS

OIL CO.

CHICAGO, U.S.A.

ROBINSON VENTILATING COMPANY

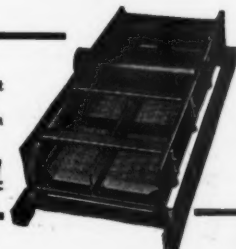
Fans and Blowers Ventilating Engineering Service

ZELIENOPLE
PENNSYLVANIA

UNIVERSAL VIBRATORS

Will do a better screening job and do it at less cost.
Write for copy of our 32-page catalog on Screens and Screening.

UNIVERSAL VIBRATING SCREEN CO.
RACINE -- WISCONSIN





THE **A B C**'s of WIRE ROPE

When a piece of unseized wire rope can rest so contentedly as this LAY-SET Green Strand, you *know* it is a relaxed rope—free of internal stress. And being relaxed—being preformed—it is a limber, flexible rope. Easy to handle, easy to splice, fast to reeve. Being preformed, LAY-SET resists kinking and whipping; almost refuses to rotate in sheave grooves; spools perfectly. More than this, LAY-SET Preformed is a safe rope to handle because when the crown wires are finally worn through they lie flat and in place, refusing to wicker out and tear workmen's hands. Naturally, having all these superior qualities, LAY-SET Preformed lasts longer—gives greater dollar value.

Send today for a free copy of "Safe Use of Wire Rope." It is so constructive you will want every machine operator to read it.

HAZARD WIRE ROPE DIVISION

Established 1848

AMERICAN CHAIN & CABLE COMPANY, Inc.
WILKES-BARRE, PENNSYLVANIA

District Offices: New York, Chicago, Philadelphia, Pittsburgh, Fort Worth, San Francisco, Denver, Los Angeles, Atlanta, Tacoma



LAY-SET

WIRE ROPE

⚙️ ALL HAZARD WIRE ROPES MADE OF IMPROVED PLOW STEEL ARE IDENTIFIED BY THE GREEN STRAND

BUY ACCO QUALITY
TRADE MARK



A FEW OF THE 137
AMERICAN CHAIN & CABLE
INDUSTRIAL PRODUCTS

AMERICAN CHAIN DIVISION
(DOMINION CHAIN COMPANY, Ltd., in Canada)
Weed Tire Chains • Welded and Weldless Chain • Malleable Castings
Acco-Morrow Lubricators

ANDREW C. CAMPBELL DIVISION
Abrasive Cutting Machines • Floformers
Special Machinery • Nibbling Machines

FORD CHAIN BLOCK DIVISION
Chain Hoists • Trolleys

HAZARD WIRE ROPE DIVISION
Lay-Set Preformed Wire Rope • "Koradless" Wire Rope • Preformed Spring-Lay Wire Rope • Guard Rail Cable

HIGHLAND IRON & STEEL DIVISION
Wrought Iron Bars and Shapes

MANLEY MANUFACTURING DIVISION
Automotive Service Station Equipment

OWEN SILENT SPRING COMPANY, Inc.
Owen Cushion and Mattress Spring Centers

PAGE STEEL AND WIRE DIVISION
Page Fence • Wire and Rod Products
Traffic Tape • Welding Wire

READING-PRATT & CADDY DIVISION
Valves • Electric Steel Fittings

READING STEEL CASTING DIVISION
Electric Steel Castings, Rough or Machined
Railroad Specialties

WRIGHT MANUFACTURING DIVISION
Chain Hoists • Electric Hoists and Cranes

In Business for Your Safety



SAFETY IS A 24 HOUR A DAY JOB



There can be no "let-up" in the vigilance required to reduce mining accidents—it must be continuous to be successful. That the mining industry is evermore watchful in nullifying hazards is proven by its continually bettering safety record.

On the equipment side of the picture you will find at M.S.A. a relentlessly unceasing search for new and improved mine safety material; constant care in the manufacturing and

testing of the many standard products bearing our name, and a splendid plant safety record. Safety is in truth a "24-Hour Job" for the industry and suppliers alike—and we are proud of our share in the work!

MINE SAFETY APPLIANCES COMPANY

BRADDOCK, THOMAS AND MEADE STREETS, PITTSBURGH, PA., U. S. A.

District Representatives in Principal Cities

V
2
4
—
1
2

D
E
C

3
8

XU

ng
rd.
the
ud

NY
S.A.